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SECOND SESSION, FIFTEENTH PARLIAMENT

OF THE

PROVINCE OF BRITISH COLUMBIA

SECOND SESSION 1921

VOLUME TWO

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ANNUAL REPORT

OF THE

MINISTER OF LANDS

OF THE PROVINCE OF

BRITISH COLUMBIA

FOR THE

YEAR ENDING 31ST DECEMBER

1921

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1922.

VICTORIA, B.C., March 22nd, 1922.

To His Honour WALTER CAMERON NICHOL,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

Herewith I beg respectfully to submit the Annual Report of my Department for the year ending December 31st, 1921.

T. D. PATTULLO,

Minister of Lands.

Victoria, B.C., March 22nd, 1922.

The Honourable T. D. Pattullo,
Minister of Lands, Victoria, B.C.

Sir,—I have the honour to submit the Annual Report of the Department of Lands for the twelve months ending December 31st, 1921.

I have the honour to be,
Sir,
Your obedient servant,

G. R. NADEN,
Deputy Minister of Lands.

PART I.

DEPARTMENT OF LANDS.

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DEPARTMENT OF LANDS.

REPORT OF OFFICE STATISTICS.

VICTORIA, B.C., March 2nd, 1922.

G. R. Naden, Esq.,
Deputy Minister of Lands, Victoria, B.C.

SIR,—I have the honour to submit the Annual Report of the Lands Branch of the Department of Lands, covering the administration of Crown lands in the Province during the year ending December 31st, 1921.

The attached statements contain a complete summary of the business done in the disposition of Crown lands and the various transactions connected therewith under the "Land Act" and sundry other Acts coming under the jurisdiction of this Branch—namely, pre-emptions, lands sales and leases, Crown Grants under the various methods of alienation, coal licences and leases.

The applications filed under the "Soldiers' Homestead Act," the "Soldiers Homestead Act Repeal Act," and the "Townsite Proportionate Allotment Act" have also been completed.

Final action was also taken with regard to the cancellation of outstanding agreements for sale of town lots and subdivided lands, and the cancellation of a large number of these delinquent agreements has taken place.

An auction of these resumed properties in the Point Grey Municipality and the City of Vancouver was held in September last and a considerable quantity of it sold. The balance is being disposed of by private sale according to the upset price established at said auction.

The administration of lands forfeited under the "Taxation Act" has proved a considerable addition to the responsibilities and duties of the staff of the Department.

I have, etc.,

H. CATHCART,
Superintendent of Lands.

PRE-EMPTION RECORDS, ETC., 1921.

Agency.	Pre-emption Records.	Certificates of Improvements.	Certificates of Purchase.
Alberni	16	2	12
Atlin	..	..	1
Cariboo	207	20	117
Cranbrook	31	12	13
Fernie	1	..	2
Fort Fraser	308	15	56
Fort George	322	12	71
Golden	3	3	14
Kamloops	30	9	13
Lillooet	146	45	162
Nanaimo	5	3	7
Nelson	13	2	11
New Westminster	3	1	2
Nicola	22	8	19
Omineca	96	9	74
Osoyoos	18	6	11
Peace River	54	5	1
Revelstoke	1	1	2
Similkameen	47	28	26
Skeena	50	2	29
Slocan	10	1	5
Stikine	..	..	..
Vancouver	97	33	49
Victoria	7	..	451
Yale	8	..	4
Totals	1,495	217	1,152

LAND-SALES, 1921.

	Acres
Surveyed (first class)	3,017.90
„ (second class)	25,456.08
	28,473.98
Unsurveyed	8,594.90
Total	37,068.88

CROWN GRANTS ISSUED, 1921.

Pre-emptions	461
"Pre-emptors' Free Grants Act"	184
Purchase	133
Mineral	265
"Soldiers' Homestead Act"	123
Town lots	112
Reverted lands (other than town lots)	227
Reverted town lots	65
Reverted mineral	64
"Townsite Proportionate Allotment Act"	22
"Dyking Assessments Act"	2
"Schools Act"	3
Soldier Settlement Board	16
Land settlement	7
Miscellaneous	15
Total	1,699
Applications for Crown grants	1,600
Certified copies	9

TOTAL ACREAGE DEEDED.

Pre-emptions	87,246.00
Mineral claims (other than reverted)	9,279.93
Reverted mineral claims	2,487.00
Purchase of surveyed Crown land (other than town lots)	17,078.24
Purchase of reverted land	6,635.15
Purchase of unsurveyed Crown land	35,463.44
Lands conveyed to Soldier Settlement Board	2,839.00
Lands Crown granted to Land Settlement Board	2,133.00
Total	163,161.76

REPORT ON COAL LICENCES, LEASES, ETC., 1921.

COAL-PROSPECTING LICENCES.

Number of licences issued, 160; area, 102,400 acres.

COAL LEASES.

Number of leases issued, 6; area, 3,840 acres.

SUNDRY LEASES.

Number of leases issued, 104; area, 17,577 acres.

PRE-EMPTIONS INSPECTED IN 1921.

Alberni	95
Atlin	...
Cariboo	58
Cranbrook	65
Fernie	8
Fort Fraser	340
Fort George	155
Golden	38
Kamloops	217
Lillooet	19
Nanaimo	1
Nelson	4
New Westminster	5
Nicola	4
Omineca	107
Osoyoos	27
Peace River	22
Revelstoke	1
Similkameen	31
Skeena	194
Slocan	4
Stikine	...
Vancouver	429
Victoria	7
Yale	12
Total	1,843

STATEMENT OF REVENUE (VICTORIA OFFICE ONLY).

Months.	Under "Land Act."								Under "Coal and Petroleum Act."					Sundry Receipts.		Total.
	Land-sales.	Rent of Land.	Survey Fees.	Crown-grant Fees.	Lease Fees.	Certificates of Improvements.	Pre-emption Records.	Royalty.	Licence Fees	Lease Rentals.	Lease Fees.	Penalty.	Lieu of Work.	Maps, Blue-prints, etc	Miscellaneous.	
1921.																
January	$ 8,570 87	$ 1,209 60	$ 39 25	$ 1,055 00	.....	....	$2 00	....	$ 1,200 00	$ 4,494 60	....	$ 25 00	$ 100 00	$ 235 85	$ 85 34	$ 17,017 51
February	6,303 99	2,043 55	64 00	895 00	$ 30 00	....	....	....	900 00	1,279 19	$ 5 00	....	200 00	254 90	28 80	12,004 43
March	14,770 98	1,805 90	227 00	1,760 00	10 00	....	2 00	....	900 00	226 50	....	....	100 00	307 30	36 25	20,145 93
April	18,038 96	3,901 85	179 00	1,205 00	25 00	$2 00	....	....	2,874 83	3,152 18	5 00	....	600 00	1,531 54	25 01	31,540 37
May	10,182 78	2,625 30	259 00	1,505 00	15 00	....	....	....	3,800 00	689 15	25 00	....	....	1,123 21	212 91	20,437 35
June	9,097 80	4,853 10	114 25	1,865 00	20 00	....	....	....	2,500 00	827 10	....	25 00	50 00	244 65	43 90	19,640 80
July	5,974 82	6,807 35	.....	855 00	10 00	....	2 00	....	500 00	13,451 78	10 00	50 00	200 00	287 55	544 38	28,642 88
August	12,274 26	2,109 95	.....	1,480 00	20 00	....	....	....	1,800 00	250 20	....	25 00	450 00	264 47	2,520 16	21,194 04
September	153,096 53	3,070 47	85 00	700 00	20 00	....	....	$ 15 40	900 00	4,683 31	....	75 00	300 00	148 25	5,966 15	169,060 11
October	2,574 64	2,223 25	54 75	1,190 00	15 00	....	....	181 95	900 00	2,421 46	5 00	25 00	50 00	391 76	1,593 04	11,625 85
November	9,779 68	3,482 20	39 50	890 00	15 00	....	....	20 80	2,600 00	3,095 30	5 00	....	50 00	786 29	95 25	20,859 02
December	3,643 92	1,502 43	422 55	1,205 00	5 00	....	....	15 47	1,100 00	945 02	....	....	50 00	699 06	103 86	9,692 31
Totals	$254,309 23	$35,634 95	$1,484 30	$14,605 00	$185 00	$2 00	$6 00	$233 62	$19,974 83	$35,515 79	$55 00	$225 00	$2,150 00	$6,224 83	$11,255 05	$381,860 60

SUMMARY.

	1909.	1910.	1911.	1912.	1913.	1914.	1915.	1916.	1917.	1918.	1919.	1920.	1921.
Pre-emption records	1,620	2,049	2,383	3,655	3,855	4,304	2,277	1,167	824	823	1,752	1,624	1,495
Certificates of Improve't.	289	439	624	715	962	1,002	665	465	541	379	326	328	217
Certificates of purchase	4,363	9,031	7,141	5,065	3,640	1,805	990	729	778	592	747	1,067	1,152
Crown grants	1,714	1,572	2,566	2,737	2,110	1,376	718	847	1,167	1,512	1,806	1,827	1,699
Total acreage deeded	326,229.54	300,587.79	524,325.99	253,143.60	390,036.32	245,244.78	75,225.00	98,452.00	187,111.64	260,321.40	512,844.87	215,364.50	163,161.76
Coal prospecting licences.	692	145	2,223	2,003	1,090	545	198	120	71	72	112	275	160
Sundry leases	83	92	121	47	46	51	38	86	73	83	51	113	104
Coal leases	.....	.....	.....	75	207	71	29	31	7	3	1	12	6
Cash received	$4,148,402.44	$3,190,416.21	$3,526,541.61	$2,525,497.29	$946,944.23	$589,687.36	$126,308.28	$159,213.65	$194,435.17	$369,392.51	$251,471.25	†$428,431.64	$381,860.60
Letters received	25,798	37,188	41,946	43,302	31,738	30,287	19,151	13,779	15,780	22,500	*53,835	32,180	28,951
Letters sent	.....	.....	23,568	21,612	17,305	14,790	10,104	8,432	12,632	12,500	18,063	19,912	22,372

*This includes total letters received by entire Department. †Cash received at Victoria only.

REPORT OF THE SUPERINTENDENT OF BRITISH COLUMBIA SOLDIER SETTLEMENT.

G. R. Naden, Esq.,
Deputy Minister of Lands, Victoria, B.C.

Sir,—I have the honour to submit herewith annual report for the year 1921 of operations under the "Soldiers' Land Act," chapter 80 of the Statutes of British Columbia, 1918, amended by chapter 76, 1919, and chapter 85, 1920.

Southern Okanagan Irrigation Project.

Construction-work on the project has been continued during the year. The main canal excavation has been continued to within a mile of the head of Osoyoos Lake and canal lining completed to a point about 11¼ miles from the diversion-dam.

The cement-pipe plant has been run continuously since April last and approximately 12 miles of pipe in varying sizes of 6 to 16 inches manufactured. The laying of cement-pipe distribution has been carried on in the areas subdivided and has been largely completed, and concrete boxes for the measurement of water to the individual lots have been constructed.

An unfortunate occurrence in the way of a cloudburst in the mountains immediately northeast of the project occurred on the night of May 19th and did considerable damage, and delayed delivery of water for some time thereafter. Temporary connections were made, however, and the permanent repairs put in hand at the close of the irrigation season.

The Okanagan River also attained a height during high water 50 per cent. in excess of the highest previous recorded flow and for a time retarded progress on parts of the construction-work.

The sawmill was not operated until the beginning of October, when the sawing of some 350,000 feet B.M. that had already been cut in the woods was undertaken.

A waterworks system for the town of Oliver has been installed and will provide an ample supply and suitable pressure for both domestic use and fire-protection.

The area now subdivided, of which detail plans have been prepared, amounts to 3,387 acres. Seventy-eight parcels have been sold, amounting to 682.90 acres, for $180,075. Amount received as first payments on same is $21,905.66.

In the townsite of Oliver sixty-eight lots have been sold for $16,810. Amount received as first payments on same is $5,055.55.

The total expenditure on the project as at December 31st, 1921, is $2,332,632.11; total sales, $196,885; total deposits, $26,961.21.

The nursery has again had a very successful year, both in regard to the number of prospective purchasers who have received favourable impressions after visiting the place and from the results obtained from the propagation of nursery stock.

Orders have been taken from the settlers for 16,000 trees for this spring delivery, and after the forthcoming sale it is expected that the remaining available trees will be in demand or used to improve unsold lots. Arrangements have been made to ensure a minimum supply of 35,000 trees for the following spring.

Following the work of improving the neglected Myer's Flat orchard, the Department sold 769½ boxes of apples from approximately 100 trees through the British Columbia Growers, which returned $564 over and above packing-house charges. Good prices were obtained for Spitz and fair for Spys, but poor and unknown varieties, of course, reduced the average returns considerably.

South Vancouver Housing.

Eight houses in South Vancouver, built under chapter 80, Statutes of 1918, "Soldiers' Land Act," are all in good standing, with the exception of one purchaser being three months' payments in arrears as a result of sickness and another being one month in arrears.

Areas of Land conveyed to the Soldier Settlement Board of Canada.

The following lands have been reserved and conveyed to the Soldier Settlement Board of Canada for soldiers who have applied for loans to the Board:—

Cariboo District.—Lot 658, 178 acres; S.W. ¼ Lot 4437, 160 acres; Lot 5081, 149 acres; N.W. ¼ Lot 6405, 160 acres; S.E. ¼ Lot 7179, 160 acres; W. ½ Lot 7255, 80 acres; N.E. ¼ Lot 8722, 160 acres; S.E. ¼ Lot 8625, 160 acres.

Coast District.—Block A, Lot 925, R. 2, 194 acres; S.W. ¼ Sec. 31, Tp. 6, R. 4, 163 acres; Lot 3189, R. 5, 160 acres; Bk. A, Lot 3718, R. 5, 160 acres; Lot 4087, R. 5, 160 acres; Bk. A, Lot 5684, R. 5, 155 acres; S.E. ¼ Lot 6440, R. 5, 160 acres; Lot 6660, R. 5, 160 acres.

Yale Division of Yale District.—Lot 779, 160 acres.

Lillooet District.—N.E. ¼ Lot 2959, 160 acres.

Total, 2,839 acres.

STATEMENT OF B.C. BETTER HOUSING FUNDS AS AT DECEMBER 31ST, 1921.

Municipality.	Amounts covered by Agreements within Time Limits.	Payments authorized by Order in Council under "B.H.A."	Amounts expired by Time Limits.	Amounts returned unused.	Balance payable.	Houses erected.	Houses under Construction or to be erected.	Total Houses.
Burnaby	$ 45,500	$ 35,000	$ 10,500	.....	.....	8	3	11
Cumberland	6,000	6,000	.....	.....	.....	..	6	6
Courtenay	35,000	35,000	.....	.....	.....	11	..	11
Cranbrook	15,000	15,000	.....	.....	.....	..	5	5
Duncan	3,500	3,500	.....	.....	.....	1	..	1
Esquimalt	25,000	25,000	.....	.....	.....	9	..	9
Fernie	12,000	12,000	.....	$12,000	.....	..	..	..
Kamloops	75,850	75,850	.....	.....	.....	22	3	25
Kelowna	32,300	32,300	.....	.....	.....	10	..	10
Langley	10,500	10,500	.....	.....	.....	6	..	6
Matsqui	2,000	2,000	.....	.....	.....	1	.	1
Nanaimo	54,000	54,000	.....	.....	.....	9	8	17
Nelson	12,000	12,000	.....	.....	.....	..	4	4
New Westminster	85,000	85,000	.....	.....	.....	25	..	25
North Vancouver City	84,200	84,200	.....	.....	.....	30	..	30
North Vancouver District	86,500	86,500	.....	.....	.....	23	4	27
Oak Bay	37,000	30,950	6,050	2,500	.....	5	4	9
Penticton	23,000	23,000	.....	.....	.....	8	..	8
Point Grey	94,000	94,000	.....	.....	.....	23	..	23
Port Alberni	16,000	16,000	.....	.....	.....	3	2	5
Port Coquitlam	16,800	16,800	.....	.....	.....	6	..	6
Prince George	74,000	74,000	.....	.....	.....	25	10	35
Prince Rupert	125,000	125,000	.....	.....	.....	41	13	54
Saanich	59,000	59,000	.....	.....	.....	14	5	19
Salmon Arm City	3,500	3,500	.....	.....	.....	1	..	1
Salmon Arm District	4,200	.....	.....	.....	$4,200	..	1	1
South Vancouver	109,500	109,500	.....	.....	.....	34	7	41
Trail	27,000	27,000	.....	.....	.....	6	3	9
Vancouver	300,000	300,000	.....	.....	.....	92	..	92
Vernon	27,200	27,200	.....	.....	.....	8	3	11
Victoria	220,000	180,000	40,000	.....	.....	46	4	50
West Vancouver	37,500	37,500	.....	.....	.....	8	4	12
Totals	$1,758,050	$1,697,300	$56,550	$14,500	$4,200	475	89	564

I have, etc.,

J. W. CLARK,

Superintendent, B.C. Soldier Settlement.

PART II.

SURVEY BRANCH.

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REPORT OF THE SURVEYOR-GENERAL.

VICTORIA, B.C., January 3rd, 1922.

To the Hon. T. D. Pattullo,
Minister of Lands, Victoria, B.C.

SIR,—I have the honour to submit the following report on the operations of the Survey Branch of the Department of Lands for the year ending December 31st, 1921:—

The results of the field-work for the season may be considered as satisfactory, especially when compared with the past few seasons. Weather conditions were generally good and little time was lost in the field on account of wet weather, except on the coast between Vancouver Island and Prince Rupert, where the summer was wetter than the average. Costs of supplies and transportation were considerably below those for last year, and this also applies to labour, which, at the same time, proved more efficient than during any previous year since the war.

A total number of forty-one qualified surveyors were employed during the season, eleven of whom were assistants. Of these, thirty-one were men who served in His Majesty's Army during the war.

The responsibility of employing labourers and other assistants was, as usual, left with the surveyors in charge of parties. They were instructed, however, to co-operate with the Provincial Government Labour Bureau and to give preference to returned soldiers.

CROWN LAND SURVEYS.

The area of Crown land surveyed totals 155,374 acres. Of this, 65,132 acres was previously surveyed by private applicants into lots of 640 acres which reverted to the Crown under the "Soldiers' Land Act," and was resurveyed, or subdivided, into parcels suitable for pre-emption. During the year 1920 practically all outstanding unsurveyed pre-emptions in accessible localities were surveyed, with the result that very few of the parcels surveyed this year were alienated at the time of survey, and, consequently, practically all the lands surveyed are vacant Crown lands and will become available for new settlers when the surveys are gazetted.

The total number of parcels surveyed was 1,018, of which eighty-eight were alienated prior to survey.

Details as to the work done are given subsequently in this report, but in general it may be stated that surveys for settlement purposes were made in the majority of districts throughout the Province. Extending from the west coast of Vancouver Island to the Peace River District, the large majority of the acreage being tributary to the Pacific Great Eastern and Grand Trunk Pacific Railways.

The practice commenced in 1920 of obtaining detailed reports on special forms on all parcels surveyed was continued this year, and copies of these reports will be open for inspection at this office and at the office of the Land Commissioner in whose district the lands are situated as soon as the surveys are gazetted.

One of the principal functions of this office is to establish and maintain and control over the large number of land, timber, mineral, and other surveys, in order that there may be no conflict of surveys on the ground and that a proper clearance can be given on future applications for Crown lands and resources. This is done by the means of compilation of maps, using existing survey information and other available data. These maps are, necessarily, according to the nature and amount of information available, more or less imperfect or incomplete. As the country develops, however, there is an increasing demand for greater accuracy and detail in these maps, and in order to meet this demand this office utilizes each year a portion of the appropriation to control surveys. These surveys are of three distinct types: (1) Traverses between individual isolated lots or groups of lots; (2) base-lines; (3) triangulation.

During the season 461 miles of traverses were run. Surveys of this nature are usually run along a road, trail, or shore-line, or, if none of these exist, along the most direct or nearest route between the points to be connected. All survey parties engaged on surveys for settlement purposes are called upon to do more or less of this class of work, to keep their work connected with previous surveys, and to tie in previous surveys not already definitely located. As a general rule this office does not accept surveys of any nature unless tied in to some previous land survey

or control point, and it is satisfactory to note that the network of Provincial surveys is now so extended that there are now very few occasions when it is not possible to comply with this rule without running an excessive distance of traverse connection.

Base-line surveys are usually run along a parallel of latitude, a meridian of longitude, or some district boundary-line. Owing to the cost no work of this nature was undertaken during the past season.

Triangulation surveys constitute the most accurate and economical means of establishing control where conditions make this class of work possible. Two parties were employed on the triangulation of the Coast inlets as a continuation of the work done in previous years. A feature of this work is that each year we find geographic features greatly at variance with, or entirely omitted on, the charts of the Coast. This year a survey was made of an inlet or lagoon running north and south through Hunter Island, measuring 12 miles in length, which has not been shown on any Admiralty Chart, although this island is immediately adjacent to the main steamer-channel between Vancouver and Prince Rupert. In all, 480 miles of coast-line was triangulated by these two parties.

One party was engaged in establishing a tie between the head of Gardner Canal and the triangulation net established last year in the vicinity of Eutsuk Lake and the westerly end of the surveyed portion of the 53rd parallel of latitude.

Another party was engaged in establishing a triangulation tie between the loose ends of the surveyed portions of the 55th parallel at Babine Lake and Middle River. This party also made a survey of a portion of the shore-line of Babine Lake. A complete triangulation was made of the shore of Mahood Lake, in Kamloops District. The total mileage of lake-shore thus triangulated is estimated at 196 miles.

In carrying on this work the Branch endeavours to keep in close touch with the operations of the Dominion Hydrographic Survey and Geodetic Survey of Canada, with a view to avoiding duplication of work and obtaining proper control by means of connection to the primary geodetic triangulation of the Dominion. Close co-operation is also effected with the Geological Survey of Canada and the Chief Astronomer of the Dominion, who has from time to time, by arrangement, established latitude and longitude stations in various parts of the Province which have materially assisted in the control of Provincial surveys.

FIELD-WORK.

For convenience in reporting on the work done by the various parties, the Province is divided into three sections, viz.: Central and Northern Interior; Southern Interior; Mainland Coast and Vancouver Island.

The following paragraphs give the names of the surveyors in charge of the various parties and the locality and nature of the work done by them in the various sections:—

Central and Northern Interior.

That portion of the Province lying north of the Dominion Railway Belt and east of the Coast range of mountains is termed the "Central and Northern Interior." It is comprised chiefly of the areas served by the Grand Trunk Pacific branch of the Canadian National Railway and the Pacific Great Eastern Railway.

Nine parties were employed in this section, as follows:—

Surveyor.	Locality.
V. Schjelderup	Burns Lake and vicinity.
A. R. Barrow	Peace River.
J. D. Campbell	Vicinity of Fort George.
R. W. Haggen	Cariboo District.
W. C. Merston	Nazko and Chilcotin Valleys.
T. H. Taylor	Anahim Lake.
W. S. Drewry	Timothy Mountain and Mahood Lake.
R. C. Farrow	Eastern Lillooet District.
G. M. Downton	Southern Lillooet District.

Messrs. Campbell and Schjelderup were employed on surveying Crown lands adjacent to the line of the Grand Trunk Pacific Railway, including vacant unsurveyed areas and the subdivision of lands which reverted to the Crown under the "Soldiers' Homestead Act." The former worked chiefly in the vicinity of Ness and Bednesti Lakes, lying north and south of

the Nechako River respectively, about 20 miles west of Prince George, while Mr. Schjelderup's work extended over areas north and south of the railway in the vicinity of Burns Lake. Mr. Barrow was engaged on miscellaneous surveys for a short period only in the Peace River District. Mr. Haggen surveyed vacant Crown lands and subdivided Soldier Homestead lands in areas tributary to Quesnel. Mr. Merston surveyed a number of scattered meadows and a considerable mileage of traverse ties in the Chilcotin, Nazko, and Baker Creek Valleys. Mr. Taylor's work was in the vicinity of Anahim Lake, some 175 miles west of Williams Lake, which district seems to present excellent opportunities for development as a stock country. Mr. Drewry surveyed lands for settlement in the vicinity of Timothy Mountain, east of Lac la Hache, and also made a triangulation survey of Mahood Lake, carrying a connection through between the east boundary of Lillooet District to the surveys on Clearwater River, tributary of the North Thompson. Mr. Farrow worked in the Upper Bonaparte Valley, including in his surveys some land of excellent quality in the vicinity of Montana Lake. Miscellaneous scattered surveys were made by Mr. Downton in South-western Lillooet District.

Southern Interior.

In the Southern Interior, comprising all that portion of the Province lying south of the Dominion Government Railway Belt, the following surveyors were employed, viz.:—

Surveyor.	Locality.
W. J. H. Holmes	West Kootenay.
S. S. McDiarmid	Vicinity of Robson.
A. H. Holland	Kettle River Valley.
H. H. B. Abbott	Kettle River Bar.
O. B. N. Wilkie	Miscellaneous.

Mr. Holmes made miscellaneous surveys on Slocan and Kootenay Lakes, and also surveyed about 2,700 acres on Big Sheep Creek, being a portion of Lot 5816, one of the blocks repurchased from the Columbia & Western Railway. A similar area was surveyed by A. H. Holland in what is known as Christian Valley, being a portion of the valley of the main Kettle River in Lot 2714, also a repurchased railway block. Mr. Abbott resurveyed certain lands at Kettle River Bar which reverted to the Crown under the "Soldiers' Homestead Act," and made a traverse tie between these surveys and other surveys farther down the Kettle River, thus closing a circuit of considerable extent and furnishing topographical data over an area which has, up to date, been very imperfectly mapped. Mr. Wilkie was employed on scattered miscellaneous work, including the Nicola, North Thompson, and Similkameen Valleys and inspection surveys in East Kootenay District. Mr. McDiarmid laid out a small addition to the townsite of Castlegar and made other miscellaneous surveys in that vicinity.

Coast and Vancouver Island.

The following surveyors were engaged on work on the Coast and Vancouver Island:—

Surveyor.	Locality.
H. E. Whyte	Saturna Island.
John Davidson	Eastern Portion Sayward District.
M. W. Hewitt	Sayward and Coast, Range 1.
F. E. Leach and A. W. Harvey	West Coast, Vancouver Island.

Mr. Whyte made a resurvey of the greater portion of Saturna Island. This was necessitated by the fact that the old survey, made nearly fifty years ago, was practically obliterated and new settlers could not determine their boundaries. Messrs. Davidson and Hewitt were engaged on miscellaneous surveys, including the subdivision of expired timber licences and triangulation and traverse ties. Mr. Leach was employed for a portion of the season on miscellaneous surveys on the west coast of Vancouver Island. He received an appointment in the Dominion Government service during the season and A. W. Harvey was instructed to take charge of his party.

Control Surveys.

Surveyor.	Locality.
J. F. Underhill	Hunter Island and Ellerslie Channel.
A. E. Wright	Principe Channel.
F. C. Swannell	Kitlope River and Tahtsa Lake.
R. P. Bishop	Babine Lake.

Messrs. Wright and Underhill were engaged on the continuation of the Coast triangulation, about 360 miles of coast-line being covered. Mr. Swannell was employed on a reconnaissance and triangulation survey in the valley of the Kitlope and Kemano Rivers, at the head of Gardner Canal, and extending to the lake district to the east of the Coast Range. Another tie was established by him between the Coast triangulation of Gardner Canal and interior surveys. An interesting feature of this work was that Kitlope Lake was found to be almost 20 miles away from the position in which it has been shown heretofore on maps of the Province. Mr. Bishop's work consisted primarily in making a triangulation tie between the ends of the surveyed portions of the 55th parallel of latitude across the Babine Range. He also tied in various other existing surveys and made a triangulation of the northerly portion of Babine Lake. His work will serve as a control for the accurate mapping of a large area in the vicinity of Babine Lake.

PHOTO-TOPOGRAPHICAL SURVEYS.

The organization for photo-topographical work for the past season was the same as in 1920. Two parties, under R. D. McCaw and G. J. Jackson respectively, were engaged on this work. Mr. McCaw extended his previous season's work in the Upper Nicola Valley and Mr. Jackson covered an area immediately to the south and adjoining Mr. McCaw's area, including the valleys of Hayes (5 miles) and Summers Creeks. An area of approximately 865 square miles was covered. Maps of these areas are now in course of preparation and will be available in the spring. As in the past, these maps are being prepared on a scale of 1/40,000, or about two-thirds of a mile to the inch, with contour intervals of 100 feet. Maps are also prepared on the same scale showing the forest and grazing types. Blue-prints of the areas covered are available, including all of the Okanagan Lake and River watershed, the Ashnola River watershed, and portion of the Upper Nicola Valley. It is proposed to incorporate the information later on maps of the Degree Sheet Series (scale 2 miles to 1 inch). One of these, the "Vernon Sheet," will shortly be ready for distribution, and it is anticipated that this publication will demonstrate the value of this class of work in connection with the development of the Province to such an extent as to allay any criticism which might be made of the cost, which, under ordinary circumstances, runs about 2 cents per acre, including both field and office work.

During the past season an experiment was made in the use of aerial photography in connection with this work. The object of the experiment was to determine the feasibility of obtaining, by means of vertical photographs, information as to the outlines of lakes, streams, roads, etc., and to control this information for mapping purposes by means of locating control points on the ordinary ground photographs, or by instrumental measurements from camera stations. As the map of the area covered is not yet sufficiently far advanced to determine definitely the value of the results obtained, a detailed report on this experiment is being withheld until a later date.

There is no doubt, however, that the use of an aeroplane for a preliminary reconnaissance of an area to be covered by photographic methods would be of considerable value to the topographer in assisting him in locating in advance, in a general way, his triangulation and camera station sites, and thus enabling him to lay out his season's work to the best advantage.

Grateful acknowledgment is due to the officials of the British Columbia Station of the Canada Air Board for the use of their equipment and staff on this work.

ALBERTA–BRITISH COLUMBIA BOUNDARY.

The Interprovincial Boundary Commission, consisting of A. O. Wheeler, the British Columbia Commissioner, and R. W. Cautley, representing both the Dominion and Alberta Governments, continued work during the year. Mr. Wheeler's party completed the monumenting of the passes in the section lying between Yellowhead and Kicking Horse Passes. The Commission is now in position to complete the second part of their report, covering that portion of the boundary between the above-mentioned passes, and it is anticipated that this report will shortly be available.

In October last the writer attended a conference of representatives of the three Governments involved in consultation with the Commissioners, held at Edmonton. It was considered that the Commission should complete the survey of the mountain section of the boundary and produce the 120th meridian southerly to its intersection with the continental divide and northerly to about latitude 50° north. It is anticipated that this can be done in three field seasons.

SURVEYORS' REPORTS.

General reports prepared by the various surveyors employed during the season are appended to this report.

PRIVATE SURVEYS.

Surveys of Crown lands made at the instance of and paid for by private parties, such as surveys of pre-emptions, applications to purchase or lease, coal licences, timber licences, mineral claims, etc., are known departmentally as "private surveys."

As nearly all pre-emptions located before the amendment of the "Land Act" in 1918, prohibiting the pre-emption of unsurveyed land, have now been surveyed, there are very few surveys of this nature to be dealt with.

The cancellation of reserves against sale or lease in various portions of the Province is, however, responsible for an increasing number of surveys of lands so applied for.

There has been a considerable reduction in the area of mineral-claim surveys dealt with as compared with 1920.

The acreage of surveys dealt with under the "Coal and Petroleum Act" is also considerably below 1920. In view, however, of the cancellation of the reserve against stakings under this Act over the greater portion of the Province, it is reasonable to expect that surveys of this nature will increase in the near future.

The acreage of timber licences surveyed is considerably below that for the previous year, although 1921 was the last year provided by the "Forest Act" for the survey of timber held under licence. At the recent session of the Legislature provision was made to extend the time to December 31st, 1922, for survey to all licences which are in good standing as to fees. There are probably only a very few unsurveyed licences affected by this legislation and the year 1922 will therefore see the completion of this class of private surveys.

OFFICE-WORK.

The office staff is divided into two main divisions—viz., the Survey Division and the Geographic Division. Very few changes have taken place in the personnel of either division and the total number employed remains the same as at the end of 1921—viz., forty-two.

The reports of the Chief Draughtsman and the Chief Geographer are appended.

I have the honour to be,
Sir,
Your obedient servant,
J. E. UMBACH,
Surveyor-General.

REPORT OF THE CHIEF DRAUGHTSMAN.

December 31st, 1921.

J. E. Umbach, Esq.,
Surveyor-General, Victoria, B.C.

SIR,—I have the honour to submit the following report on the work of the Survey Division for the year ending December 31st, 1921:—

A general review of the work done during the past year shows that there has been a steady increase in the total volume of work carried out. The various members of the staff have shown great interest in their work and a high standard of efficiency has been maintained throughout.

The personnel at the end of the year numbers twenty-two, being the same as at the end of 1920. Two changes have been made, however, two members having resigned, while two other members of the service were promoted to their positions.

OFFICE-WORK.

The preparation of official plans from the field-notes of surveys received throughout the year, together with the compilation of new reference maps and the clearance of all land and timber applications, has formed the bulk of the work done. In addition, considerable time was taken up in dealing with correspondence and attending to the requests of surveyors and the general public for information as to field-notes, plans, etc., of the surveys throughout the Province.

There has been a large increase in the number of requests for descriptions and clearance of applications for reverted lands. The majority of such lands revert according to plans of subdivision on file in the local Land Registry Offices. As a result of this, it was decided to apply to the various Registrars for copies of such plans as they were required from time to time, and to date 544 copies of such plans have been received. These plans are being carefully indexed and tabulated by the Geographic Division.

The following records give (as well as it is possible to do so in figures) an outline of the work carried out.

FIELD-NOTES.

During the year 1,031 field-books were received, as against 1,117 received during 1920. The various surveys contained in these field-books consist of 1,383 land lots, 264 mineral claims, 100 timber licences, and 126 traverse connections or triangulations.

During the same period 1,923 lot surveys were plotted and found to be in order. Notice of their acceptance duly appeared in the Gazette. Tracings of these lots were prepared and forwarded to the respective Government Agents.

The following table gives an analysis of the acreage of the various kinds of surveys gazetted during the year:—

	Acres.
Pre-emption surveys	3,078
Purchase surveys	8,122
Mineral-claim surveys	6,290
Timber-licence surveys	247,766
Coal-licence surveys	4,423
Lease surveys	11,884
Government surveys	127,797
Total	409,360

A comparison of these figures with those of previous years, as far back as 1900, may be found by reference to Table A attached to this report.

The acreage of Government surveys gazetted during the year shows a large increase over that of the previous year, as is also the case in connection with lease surveys.

TIMBER SURVEYS.

Field-notes covering the survey of 100 licences were received during the year, as compared with 435 during 1920.

RIGHT-OF-WAY PLANS.

The recording and examination of the plans of railway rights-of-way, logging-railways, and pole-lines has been carried on as heretofore. During the year 297 miles of various railway right-of-way plans were examined and finally cleared for Crown-granting purposes.

CLEARANCES.

As in previous years, clearance reports have been furnished by this Branch on all applications for lands dealt with by the Lands Department. These include 1,495 applications for pre-emption, 360 applications to purchase, 160 coal licences, 104 miscellaneous leases, 1,699 Crown-grant applications, together with 755 timber-sales and 374 hand-logger licences.

DEPARTMENTAL REFERENCE MAPS.

Attached hereto, and shown as Table C, is a list of these maps, giving the price for which the blue-prints of same can be obtained. There are now 120 such maps in use, as against seventy-nine at the end of 1912. During the past year sixteen new maps were compiled and two retraced.

INFORMATION SUPPLIED TO SURVEYORS AND OTHERS.

A nominal charge is made for the preparation of copies of field-notes, blue-prints, etc., required by surveyors and others. The revenue derived for the copying of field-notes was $492.90, while the sum of $1,511.70 was paid in for blue-prints. It is calculated that over 10 miles of blue-print paper was used during the year.

The following is a statement of the number of blue-prints made:—

Mail and counter orders	1,363
Surveyor-General's Branch	3,196
Forest Branch	12,721
Other branches of Government service	12,007
Sundry	2,214
Total	31,501

There were also prepared 1,699 tracings (in duplicate) to be attached to Crown grants and 104 tracings (in duplicate) to accompany land leases.

CORRESPONDENCE AND ACCOUNTS.

During the year 6,500 letters were received and 6,629 sent out, which includes interdepartmental memoranda.

Table B attached to this report gives a summary of the office-work for the year 1921 and comparative figures for 1920.

I have, etc.,
F. O. MORRIS,
Chief Draughtsman.

APPENDIX TO REPORT OF CHIEF DRAUGHTSMAN.

TABLE A.—SHOWING ACREAGES OF EACH CLASS OF SURVEYS GAZETTED EACH YEAR SINCE 1900.

Year.	Pre-emptions.	Purchases.	Mineral Claims.	Timber Limits.	Coal Licences.	Leases.	B.C. Govt. Surveys.	Totals.
	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
1900	22,873	4,419	33,441	59	.....	664	10,057	71,513
1901	26,493	16,401	33,400	2,027	.. ..	593	.....	79,094
1902	35,297	29,652	31,057	1,040	626	1,026	.....	98,698
1903	37,615	26,787	18,115	127,992	.....	2,003	800	213,312
1904	48,124	36,468	20,549	155,279	48,670	3,009	179	312,278
1905	42,660	58,705	15,535	214,841	137,218	806	107	469,872
1906	33,573	66,668	9,894	77,829	41,312	9,566	.....	238,842
1907	50,460	162,218	10,017	83,016	20,367	4,387	113,968	444,433
1908	66,788	147,980	14,607	167,925	9,821	2,580	97,072	506,773
1909	71,316	145,325	10,744	426,121	8,310	15,239	512,373	1,189,428
1910	79,273	455,356	12,499	509,201	43,363	5,864	302,536	1,407,912
1911	89,485	1,352,809	21,325	686,909	120,938	6,500	948,644	3,226,610
1912	99,461	1,011,934	16,645	804,730	99,236	8,560	826,362	2,866,997
1913	55,202	508,062	18,043	1,181,355	72,719	4,740	1,014,366	2,854,487
1914	45,551	234,580	7,546	1,105,635	36,098	4,209	1,078,579	2,512,198
1915	22,746	41,551	8,339	512,628	29,245	841	705,170	1,320,520
1916	14,335	8,771	7,677	302,903	10,983	5,145	124,953	474,767
1917	12,632	802	8,386	275,538	2,843	2,960	111,256	414,417
1918	10,835	1,634	9,247	223,768	953	2,342	60,311	309,090
1919	8,514	153	10,264	165,289	160	1,495	77,121	262,996
1920	8,172	5,992	12,580	347,729	22,143	3,227	63,505	463,348
1921	3,078	8,122	6,290	247,766	4,423	11,884	127,797	409,360

TABLE B.—SUMMARY OF OFFICE-WORK FOR THE YEAR 1921 AND COMPARATIVE FIGURES FOR 1920.

	1920.	1921.
Number of field-books received	1,117	1,031
„ lots surveyed	1,231	1,383
„ lots gazetted and tracings forwarded to Government Agents	1,598	1,923
„ miles of right-of-way plans dealt with	220	297
„ applications for purchase cleared	351	360
„ applications for pre-emption cleared	1,624	1,495
„ reference maps compiled	13	16
„ Crown-grant applications cleared	2,014	1,699
Total number of letters received by Branch	6,261	6,500
„ „ Crown-grant and lease tracings made in duplicate	1,923	1,803
„ „ blue-prints made	30,381	31,501
Total revenue from sale of blue-prints	$2,037.70	$2,004.60

TABLE C.—DEPARTMENTAL REFERENCE MAPS.

Price-list of Blue-prints.

		Scale.	Price.
1.	West Coast, V.I. (Barkley Sound, Southerly)	1 inch to 1 mile	$1 00
1A.	West Coast, V.I. (Barkley Sound, Northerly)	„ „	1 00
2.	West Coast, V.I. (Nootka District)	„ „	1 00
3.	Belize and Seymour Inlets and Smith Sound	„ „	1 00
3A.	Quatsino Sound and West Portion of Rupert District	„ „	1 00
3B.	Gilford, Cracroft, and Broughton Islands	„ „	1 00
3C.	Nimpkish River Valley and Lake	„ „	1 00
3D.	Central Portion of Rupert District	„ „	1 00
4.	Knight, Bute, and Loughborough Inlets	„ „	1 00
4A.	Sayward District, Thurlow, Valdes, and Redonda Islands and Powell Lake and Toba Inlet	„ „	1 00
5.	Texada Island and West Portion, New Westminster District	„ „	1 00
5A.	Jervis and Seechelt Inlets	„ „	1 00
5B.	Howe Sound and Cheakamus River Valley	„ „	1 00
5C.	Harrison Lake and Lillooet River Valley	„ „	1 00
6A.	Nicola Valley	„ „	1 00
6B.	Princeton and vicinity	„ „	1 00
6C.	Ashnola and South Similkameen River Valleys	„ „	1 00
7.	North Okanagan and Mabel Lake	„ „	1 00
7A.	South Okanagan Lake and Kettle River Valley	„ „	1 00
7B.	Similkameen District (Keremeos, Fairview, and Greenwood)	„ „	1 00
11.	Clearwater and Murtle River Valleys	„ „	1 00
11A.	North Thompson River Valley	„ „	1 00
12.	Dean and Burke Channels and Bella Coola Valley	„ „	1 00
12A.	Dean (Salmon) River Valley	„ „	1 00
12B.	Kimsquit and West Side of Dean Channel	„ „	1 00
13.	Rivers Inlet and Fitzhugh Sound	„ „	1 00
14.	Banks and McCauley Islands	„ „	1 00
14A.	Graham Reach, Gardner Canal, and Kitimat Arm	„ „	1 00
14B.	Kitlobe River and West End of Eutsuk and Whitesail Lakes	„ „	1 00
14C.	Grenville, Squally, and Douglas Channels	„ „	1 00
15.	Moresby Island, Northern Portion	„ „	1 00
15A.	Moresby Island, Southern Portion	½ inch to 1 mile	1 00
16.	Graham Island, North-east Portion	1 inch to 1 mile	1 00
16A.	Graham Island, South-east Portion	„ „	1 00
16B.	Graham Island, West Portion	„ „	1 00
17.	Portland Canal and Observatory Inlet	„ „	1 00
17A.	Skeena River Valley (vicinity of Hazelton)	„ „	1 00
17B.	Nass and Kitwancool River Valleys	„ „	1 00
18.	Upper Fraser and Morkill River Valleys	„ „	1 00
18A.	Tete Jaune Cache and Upper Fraser River Valley	„ „	1 00
19.	Lower Skeena and Zymoetz River Valleys	„ „	1 00
19A.	Skeena and Kitsumgallum River Valleys	„ „	1 00
19B.	Prince Rupert, Mouth of Skeena and Nass Rivers	„ „	1 00
20.	Bulkley River Valley (Hazelton to Moricetown)	„ „	50
21.	Barkerville, Willow and Bowron River Headwaters	„ „	1 00
21A.	Fraser Lake, Endako River and South End of Stuart Lake	„ „	1 00
22.	Bowron and Upper Fraser River Valleys (vicinity of Hutton)	„ „	1 00

Table C.—Departmental Reference Maps—*Continued.*

Price-list of Blue-prints—Continued.

		Scale.	Price.
22A.	Fraser River, Fort George, South	1 inch to 1 mile	$1 00
22B.	Portion of Nechako, Stuart, and Salmon River Valleys	„ „	1 00
22C.	Blackwater and Chilako River Valleys	„ „	1 00
22D.	Fraser and Cottonwood River Valleys	„ „	1 00
22E.	McBride, Goat and Upper Fraser River Valleys	„ „	1 00
23.	Quesnel Lake (North and East Arm)	„ „	1 00
23A.	Quesnel Forks and Swamp River	„ „	1 00
23B.	Fraser River, Quesnel, South	„ „	1 00
23C.	Nazko River Valley	„ „	1 00
24.	150-Mile House and Harpers Camp	„ „	1 00
24A.	Anderson and Seton Lakes, Lillooet District	„ „	1 00
24B.	Lillooet Dist. (Clinton, Bridge Riv. & Taseko (Whitewater) Lakes)	„ „	1 50
25.	Mainland Coast, Princess Royal and Adjacent Islands	„ „	1 00
25A.	Bella Bella and Milbank Sound	„ „	1 00
26.	Porcher and Adjacent Islands	„ „	1 00
27.	Fraser River Valley (Williams Lake and Soda Creek)	„ „	1 00
27A.	Fraser and Lower Chilcotin River Valleys and Lac la Hache	„ „	1 00
27C.	Green Lake and Canoe Creek Valley	„ „	1 00
28.	North Part of Babine and Takla Lakes	½ inch to 1 mile	1 00
28A.	Stuart and Babine Lakes	1 inch to 1 mile	1 00
29.	Chilcotin, West of 124th Meridian	„ „	1 00
29A.	Anahim and Abuntlet Lakes	„ „	1 00
29B.	Chilcotin River Valley, vicinity of Alexis Creek	„ „	1 00
30.	Bonaparte River Valley and Canim Lake	„ „	1 00
31.	Bulkley Valley	„ „	1 00
31A.	Francois and Babine Lakes	„ „	1 00
32A.	Tatlayoko Lake	„ „	1 00
32B.	Homathko and Klinaklini River Valleys	„ „	1 00
33.	Fraser River Valley, Fort George, North	„ „	1 00
34.	Lot 4593, Kootenay District, West Portion, Flathead River	2 inches to 1 mile	50
34A.	Lot 4593, Kootenay District, East Portion, Flathead River	„ „	50
35.	Saltspring, Gabriola, and Adjacent Islands	1 inch to 1 mile	1 00
36.	Upper Fraser River (vicinity of Hansard and McGregor River Valley)	„ „	1 00
36A.	Headwaters of Wapiti and Herrick Rivers	„ „	1 00
37.	Nechako River, Cluculz and Bednesti Lakes	„ „	1 00
38A.	Groundhog Coal Area, East of Meridian	„ „	1 00
38B.	Groundhog Coal Area, West of Meridian	„ „	1 00
38C.	Upper Nass River Valley	„ „	1 00
39.	West End of Ootsa Lake	„ „	1 00
39A.	Eutsuk Lake	„ „	1 00
40.	Euchiniko and Tetachuck Lakes	„ „	1 00
41.	Upper Nechako River and East End of Ootsa Lake	„ „	1 00
42.	Big Bend, Kootenay District	„ „	1 00
42A.	Adams Lake and River	„ „	1 00
42B.	Canoe River Valley	„ „	1 00
42C.	Columbia River Valley (vicinity of Bush River)	„ „	1 00
43.	Peace River, South of Dominion Government Block	„ „	1 00
43A.	Peace River, North of Dominion Government Block	„ „	1 00
44.	Kiskatinaw, Murray, and Sukunka Rivers	„ „	1 00
44A.	Wapiti, Murray, and Head of Parsnip Rivers	„ „	1 00
45.	Foreshore of Vancouver Island (E. & N. Railway Belt)	„ „	1 00
46.	Saanich District and Islands	„ „	1 00
47.	Peace River Valley, West of Dominion Government Block	„ „	1 00
48.	Crooked and Parsnip River Valleys	„ „	1 00
50.	Parsnip and Peace River Valleys	„ „	1 00
51.	Finlay River Valley	„ „	1 00
52.	Atlin Lake and vicinity	½ inch to 1 mile	1 00
53.	Telegraph Creek and Stikine River Valley	„ „	1 00
54.	Upper Nass River Valley and Meziadin Lake	1 inch to 1 mile	1 00
15–0.	Upper Elk and White River Valleys	„ „	1 00
15–9N.	Fernie and Crowsnest vicinity	„ „	1 00
15–9S.	Elko and vicinity	„ „	1 00
16–9N.	Kootenay River Valley and Cranbrook	„ „	1 00
16–9S.	Moyie River Valley	„ „	1 00
17–0S.	Duncan Lake and North End of Kootenay Lake	„ „	1 00
17–9N.	Kootenay Lake, vicinity of Kaslo	„ „	1 00

TABLE C.—DEPARTMENTAL REFERENCE MAPS—*Continued.*

Price-list of Blue-prints—Continued.

		Scale.	Price.
17–9s.	Nelson, Salmon River Valley, and South End of Kootenay Lake	1 inch to 1 mile	$1 00
18–9N.	Edgewood and Slocan River Valley	" "	1 00
18–9s.	Rossland and South End of Lower Arrow Lake	" "	1 00
18–20.	Nakusp and Upper Arrow Lake	" "	1 00
21–23.	Columbia and Windermere Lakes	" "	1 00
27–29.	Columbia River Valley, Wilmer, and Spillimacheen	" "	1 00
30–32.	Trout and Upper Arrow Lakes	" "	1 00

NOTE.—These reference maps show lands alienated and applied for, "Timber Limits," "Coal Licences," etc., surveyed and unsurveyed. They are compiled from all available data and are constantly being amended, and their accuracy is therefore not guaranteed. They were prepared originally for departmental use, and, having proved of value to the public, blue-prints of same are now on sale.

Victoria, February 1st, 1922.

REPORT OF THE GEOGRAPHIC DIVISION.

February 6th, 1922.

J. E. Umbach, Esq.,
Surveyor-General, Victoria, B.C.

SIR,—I have the honour to submit the report of the Geographic Division for the year ending December 31st, 1921.

The scheme of work outlined in the report of 1920 has been carried forward successfully. We satisfied the demands for republication of the pre-emptors' sheets, and at the same time made greater progress in the preparation of new publications. Only one change in the staff has occurred during the year—Mr. Wheatley being transferred to a vacancy in the Survey Division, while Mr. Tate was engaged to fill the junior assistant position so left vacant in the Geographic Branch.

The extension of the Standard Base Map staff as planned was postponed, so that it has been impossible to produce the full schedule of standard quadrilaterals on scale of 20 chains. The S.B.M. scheme has, however, completely proved its value in present and future economy. It has allowed us to accomplish survey compilations which before could not be considered. It has given, and will give, accuracy in the production of all our mapping which was not heretofore possible, and the lack of which has been a continual source of useless worry and waste of time. If this scheme be expanded to permanently maintain sufficient of the control points upon the ground, it can thus provide a skeleton of strength for survey-work in the field, which will be invaluable in years to come.

The work of the Division has been more definitely organized, and the high standard of quality has been upheld by the loyal and interested efforts of the staff, through whose co-operation the work has been efficient and enjoyable.

PRE-EMPTORS' MAPS.

Name.	No. of Copies.	Date of Issue.	No.	Scale.	Area in Sq. Miles.
Chilcotin. Compiled and drawn	4,100	Feb., 1921	3F	3 m. to 1 in.	9,000
Prince Rupert. Corrected and enlarged	5,750	April, "	3M	" "	10,000
North Thompson. Revised and compiled to projection	4,650	July, "	3J	" "	9,000
Nechako. Revised, expanded, and compiled to projection	7,250	Sept., "	3B	" "	9,000
Quesnel. Corrected, revised, and expanded	7,400	Nov., "	3G	" "	9,000
In Course of Preparation, 1922.					
Peace River. Corrected and partly redrawn. In hands of printer	4,000	March, 1921	3E	4 m. to 1 in.	12,000
Fort George. Compilation at present in hand	....	.....	3A	3 m. to 1 in.	9,000
Stuart Lake. Compilation at present in hand	....	.....	3C	" "	9,000

There are now four of our Pre-emptors' Series completed upon the polyconic projection in addition to the six noted in the report of last year, making ten in all.

Having the basis of the S.B.M. system, progress has been made in the new compilations of the Stuart Lake and Fort George areas. When these two sheets are produced—about the middle of 1922—all of the present Degree Sheet Series, with the exception of Graham Island, will be on polyconic projection, and will so have accurate relation one to the other and actual position on the earth's surface.

DEGREE SHEET SERIES.

Name.	No. of Copies.	Date of Issue.	No.	Scale.	Area in Sq. Miles.
Vernon. Sheet compiled to projection, comprising land surveys, contoured topography, etc., four colours, and drawn for reproduction	6,000	Dec., 1921	4J	2 m. to 1 in.	2,000
In Course of Preparation, 1922.					
Kelowna. Sheet compiled to projection, comprising land surveys, contoured topography, etc.	.....	July, 1922	4K	2 m. to 1 in.	3,100

The compilation of these two sheets has been completed during the year. The contoured area showing in the Vernon Sheet, other than photo-topographical survey made by R. D. McCaw, B.C.L.S., was interpolated and redrawn from surveys made by the Geological Survey of Canada. The roads and general informatory data were compiled and the drawing of the Vernon Sheet for photolithography was completed. The sheet is now in the course of printing and the issue will be available at the end of January, 1922.

The drawing of the "black" for the Kelowna Sheet for photolithography is almost completed.

With the production of these sheets a new and valuable departure in Provincial mapping will have been attained—the land surveys being shown in conjunction with the topographical relief contouring, besides the road classification, administrative boundaries, and general information. This system of mapping will furnish the basis for all classes of engineering in connection with irrigation, water-power, forestry, roads, mining, etc.

Our stock of the issues of the Rossland, Nelson, and Cranbrook Degree Sheets, which were produced in rough form in 1911–12, has been exhausted for some time, and we have therefore been unable to fill the considerable demand for these sheets. In the ensuing year effort will be made to commence compilation of these areas, and in this connection it is suggested that wherever topographical surveys which come within these areas have been made in former years by Dominion or other departments, it will be possible to incorporate such with our land surveys sufficiently to allow the production along the standard lines referred to in the Vernon and Kelowna Sheets, and so make such information of prime value to the engineering requirements of the districts.

There has been demand for the Arrowhead Degree Sheet, which was laid aside in 1915. Owing to preparation of more pressing mapping, opportunity to produce this work has not yet occurred, but effort will be made during 1922 to resume work upon it.

LAND SERIES MAPS.

Name.	No. of Copies.	Date of Issue.	No.	Scale.	Area in Sq. Miles.
Powell Lake. Compiled to projection, drawn for photo reproduction	.....	Sept., 1922.	2D	4 m. to 1 in.	15,000

The compilation of the Powell Lake Sheet was held up for months for reasons stated in our report of last year—viz., the control astronomic determinations. These were received, the compilation was proceeded with satisfactorily, and is almost finished.

One-third of the outline of the key colour—black—for photolithography has been completed. We anticipate producing this map about the middle of 1922.

DISTRICT AND DIVISION SERIES.

Name.	Date of Issue.	No.	Scale.	Remarks.
Map of B.C. Mining Divisions Revised to date. In hands of engraver. Wax-plate process	.....	....	50 m. to 1 in.	Prepared for Mines Department.
Map of B.C. Land Recording Divisions.	April, 1921	1cx	" "	4,200 copies.
Map of B.C. Land Registry Districts.....	July, "	....	30 m. to 1 in.	1,500 copies in additional colours to show boundaries.
In Course of Preparation, 1922.				
Map of B.C. Compilation finished; drawing for reproduction almost finished	Aug., 1922.	....	30 m. to 1. in.	This to replace former edition now exhausted. A complete series of administration districts and divisions will be prepared.

Substantial progress was made in the compilation and drawing of the new map of the Province and it is now practically finished. There remains the verification of detail and naming and the incorporation of this season's surveys. The drawing of our map of Northern Interior, published in 1917, is to be used in this map, thus providing a saving, and has yet to be checked over and altered to conform with our later data.

Repeated inquiry has been made for a map of the Province showing the relief. In this connection it was proposed to compile on the new map of British Columbia the topographical surveys in British Columbia which have been made by Dominion and Provincial Governments. The work of collecting and compiling has been taken up from time to time as opportunity presented throughout the year. What seemed at first to be a measurable work has proved a rather large undertaking, but has had a further result in indexing the large amount of topographic data procured in surveys of past years, but which had not until now been collected in one comprehensive scheme.

GEOGRAPHIC SERIES.

There has been much demand for a general map covering the south-west portion of the Province. The old map of the south-western portion was formerly one of the principal publications, and the old plate was brought up to date and reprinted numerous times. In 1912 there were two issues of this old sheet, and it was then decided that the condition of the plate was so poor that it would be too expensive at later time to bring it up to date. The old plate was therefore discarded. It was proposed that instead of making an entirely new compilation for the production of a new south-western map, the Land Series Sheets, which were greatly demanded, should be pushed forward as rapidly as possible, and when these were completed they would form an easy and cheap basis for the publication of the south-west portion of the Province. It was also pointed out that from the sale of this map a proportion of the cost of the production of the Land Series maps would be obtainable, the demand for a general geographic sheet of this area being large from commercial and tourist sources.

With the completion of the compilation of the Powell Lake Sheet, the drawing for photo-lithography of this map area will be commenced.

MISCELLANEOUS.

Name.	Scale.	For whom prepared, printed, etc.
Peace River Oil Report, E. M. Spieker, Map.....	3 m. to 1 in.	Water Rights Branch. Drawn for photo reproduction.
Powell Lake Subdivision Plans.....	300 ft. to 30 chains to 1 in.	Compiled and drawn for photo-zincography.
Special Map of B.C.....	30 m. to 1 in.	Liquor Control Board. Prepared drawing for reproduction.
Okanagan and Nicola Topographic Map (4 sheets)	1:40,000	Surveys. Design and lettering.
Oliver Townsite Maps—		
No. 1.....	200 ft. to 1 in.	
" 2.....	800 ft. to 1 in.	Water Rights Branch.
" 3.....	" "	
" 4.....	" "	Published only.
" 5.....	" "	

In addition to the above, numerous small works were undertaken for the various departments, the redefinition of the electoral, assessment, Land Registry counties, etc., causing numerous requests for special maps of same.

GEOGRAPHICAL NAMING AND GAZETEER.

The naming in connection with geographical features of the Province has been referred to this office. Considerable addition has been made in permanently recording such naming in the records of the Geographic Board of Canada. This entails a large amount of searching of records and historical data and consumes a corresponding amount of time. The time, however, is minimized, and in most cases serves a double purpose in connection with the preparation of our new Geographical Gazeteer of the Province.

Although the assistant who is compiling the Gazetteer has been interrupted in his work for considerable periods in carrying on his other duties of checking, proof-reading, all naming, filing, and arrangement of geographical data, research in connection with the Geographic Board of Canada, the first operation in the compilation of the Gazetteer was completed in August, making a total of 16,622 cards filled in. These were then copied in ink to make a permanent record. The second operation of the Gazetteer, that of filling in detailed information covering the places recorded, is now well forward, approximately two-thirds of this work being completed. Besides the main operations in the preparation, a cross-index of old and other names of the geographical features has been completed, and is ready to be incorporated with the main Gazetteer when the Gazetteer cards shall be arranged in alphabetical order. This index is covered by approximately 1,700 cards.

The importance of showing in our maps educational facilities throughout the Province has been more and more apparent, and in order that such information should be reliable an indexed school-location system was instituted. Index cards were sent out to the Secretary of the Board of each school wherever necessary, and these, when properly filled in for location, have been included in our geographical index system.

Our indexes of post-office locations and other Provincial data have been kept up to date.

COST-CARD SYSTEM.

In past years the staff has been called upon to execute a large number of demands for special draughting by various departments of the Government; so much that these at times seriously interfered with the primary objects of the Division. To regulate this without inconvenience to the service, a cost-card system was introduced, so that all such work could be correctly charged to the department sending in the work. In this year forty-four demands for work of this nature were accommodated. These constituted many forms of draughting, from map-work to design and sketching, and were submitted by nearly all departments of the Government and the various branches of the Lands Department.

MAP-MOUNTING.

The volume of map-mounting this year has exceeded that of the preceding year. The work has been especially extended in the joining-up and mounting of the photostat prints and blue-prints, these having more than doubled in volume.

The rearrangement of accommodation referred to in our report of last year has proved particularly advantageous, and many fine examples of map-mounter's art have been turned out. One especially fine work was the preparation of a loose-leaf map-book containing a complete set of maps covering the cities and municipalities of the Province. This is the first time that such a record has been collected and bound together in permanent form.

A synopsis of the work accomplished during the year is as follows:—

Loose-leaf map-books prepared	6
Maps cut to fold and mounted	927
Blue-prints mounted	644
Photostat prints fitted, joined up, and mounted	513
Official maps repaired	5

In addition to carrying out the map-mounting requirement of the Survey Branch, the cash receipts and departmental credits for the period January 1st to December 31st amounted to $1,594.45.

PHOTOSTAT.

The rearrangement for photostating accommodation has worked smoothly and efficiently during the present year. Although in the work done for the public the amount has decreased

about 20 per cent. from that of last year, the work completed for the departments has increased about the same percentage. In addition to the general demands for work, there has been an increasing requirement for reproduction to precise measurement. Such work has been greatly expedited by the use of the vertical copying-board, which allows of a 7:1 reduction, whereas the machine itself is built for a 2:1 reduction. In 1920 nineteen reproductions were completed by use of the vertical copying-board, whereas in 1921 this number increased to 109. A list of work completed is appended.

Requisitions for 1921—	Receipts and Credits.
Departmental, 568	$1,537 50
Public, 204	710 85

It is gratifying to note that, although the past year will be known as a period of depression, work in our photostat has shown a substantial level throughout. It is therefore anticipated that when conditions for engineering projects improve there will be correspondingly increased demand for the work of our photostat equipment.

Map Stock and Distribution.

The map-distribution direct to the public from the Geographic Division has proceeded satisfactorily. A saving has been effected by the organization which enables the work to be done in a portion of the time by a junior apprentice, whereas formerly it occupied considerable time of higher-priced clerks. The centralization in attending to map requests has proved a restraining influence upon duplication and wastage. At the same time the public receives speedy attention to requests.

Last year the time of the staff was principally engaged in preparation of our pre-emptors' maps to replace our depleted stocks. This year we have been able to devote greater attention to preparation of required new works.

The total number of maps issued to departments and public during 1921 was 16,375. Maps received into geographic stock, 24,492. A large proportion of the requests was for single maps. Certain special maps were printed for distribution by other departments, amounting in number to 12,800.

Letters received and answered during the year totalled 1,298, an increase of 30 per cent. over the preceding year.

Cash receipts for printed maps and draughting, January 1st to December 31st	$1,750 24
Credits (Lands Department) for printed maps and draughting, January 1st to December 31st	1,033 15
Total	$2,783 39

Standard Base Map.

Reviewing the work of the year in connection with our Standard Base Map system, and especially looking towards the practical application unfolded by the progress of the work, it is most gratifying to be able to report that the result has more than justified the hopes that were entertained for this scheme. Owing to present necessity for limiting expansion the staff as originally proposed has not been engaged. It has, however, been possible to steadily continue our policy of laying down the skeleton traverses and the compiling, computing, and fixing of the main control positions. This year 7,748.80 miles of skeleton traverse were laid down. This, in conjunction with the mileage laid down in 1920, totalling 17,090.90 miles, or 135 main routes, to date. Of these routes, thirty-four have been balanced and forty-seven computed.

The second operation of the scheme—that of plotting the skeleton routes on the scale of 1 mile to 1 inch—was begun; twenty-one sheets of 30-minute area, plotting all the skeleton routes contained in the area, have been completed.

The skeleton sheets on completion immediately proved their value, offering wherever available a solid constructive basis for the maps produced by the Geographic Division, minimizing the possibility of error, expediting the constructive work, and broadening the efficiency of the staff. This same effect has been realized by the Survey Division in their work in preparing new reference maps.

An initial effort was made on the third stage of the S.B.M. scheme—that of plotting of 10-minute quadrangle sheets on the scale of 20 chains to 1 inch (the Standard Base Map). Two

of these sheets were partially completed. The demand for the skeleton sheets of 1 mile to 1 inch has been so immediate that these proved the main object for this year.

The requirement for obtaining an advance plot of the triangulation of the coast-line of the Province, between the north end of Vancouver Island and Prince Rupert, necessitated special employment of one of the S.B.M. staff.

LAND REGISTRY PLANS.

Demand for copies of Land Registry plans in the administration of the Lands Department has been increasing. Heretofore as each demand arose delay was experienced until copies of these plans could be obtained. Arrangement was made by the Surveyor-General to obtain copies of these plans from the District Land Registry Offices, so that these would be available and avoid any delay within the Department. The Geographic Division was asked to devise and submit a system for filing this information, and subsequently requested to carry out the work of indexing and registering all such plans received, according to the system conforming with the principle of the Central Index. The importance of immediately putting this work into effect has necessitated giving it precedence over the work of the Central Index, as both these works are wholly in the hands of the S.B.M. Registrar.

The method of indexing requires the exact geographical location of the registered lots, and also entry under the district registered plan number; 544 plans have been received since this was instituted, making in all 1,088 entries.

CENTRAL INDEX.

The Central Index has proceeded in available time, so that 20 per cent. of the plans to be indexed were completely entered during the year. This amount, with the 15 per cent. accomplished in 1920, brings the total to 35 per cent. of the plans filed in the Lands Department.

At present date the Central Index is not sufficiently advanced to place it in general use, but it is clearly evident, from the work done so far, that this system is the one which will provide permanency in our filed records. In its construction a reference is made so quickly and definitely that it must also provide an appreciable economy in the time of the public and staff.

I have, etc.,
G. G. AITKEN,
Chief Geographer.

OOTSA AND BURNS LAKE, RANGES 4 AND 5, COAST DISTRICT.

BY V. SCHJELDERUP.

BURNS LAKE, B.C., November 21st, 1921.

J. E. Umbach, Esq.,
Surveyor-General, Victoria, B.C.

SIR,—The work this season consisted of the survey of Crown lands in the vicinity of Tchesinkut Lake, Wistaria, and north of Burns Lake; the running of centre lines in previously surveyed lots in the district between Francois Lake and Ootsa Lake; the triangulation of Taltapin and Augier Lake, and various connection traverses; 7,790 acres of Crown lands were surveyed and 5,800 acres subdivided, lakes to the extent of 16 miles in length were triangulated, and 24 miles of connection lines and traverses were run.

TCHESINKUT LAKE.

This beautiful lake lies some 3 miles north of Francois Lake and parallel to same. It is about 10 miles long, with an average width of 1 mile, and has an elevation of 2,400 feet above sea-level. The main Government wagon-road from Burns Lake to Francois Lake meanders along the shore-line of the west end of the lake for about 1½ miles. The distance from Burns Lake is 9 miles.

Practically all the land surveyed by me in 1913 and 1914 has been taken up under pre-emption record, although the land is far from what one might call first-class agricultural land. A new school-house was built this spring and a post-office established this fall.

The lake affords very good fishing; especially grey and rainbow trout are plentiful and of exceedingly fine quality. Small game such as geese and rabbits are numerous everywhere. Deer, moose, and black bear are found in fair numbers, but here, as elsewhere in the district, not very plentiful.

The land, 3,854 acres surveyed this season, is situated on the north shore and at the east end of the lake. A detailed report on each parcel surveyed accompanies the field-notes of the surveys and therefore details will not be entered into in this report.

The proposed trunk road to connect the Bulkley and Nechako Valleys follows the north shore of Tchesinkut Lake, and, if ever built, I have no doubt that the larger percentage of the land surveyed will be taken up by incoming settlers. Some of the land has already been applied for and settlers are in occupation.

Wistaria and Streatham.

This part of the district may be reached by wagon-road either by way of Burns Lake or Houston. The distance from Burns Lake to Wistaria Post-office is some 50 miles and the distance from Houston practically the same. The Burns Lake route is the best and the one generally used by most of the settlers. Streatham Post-office is situated about half-way between Ootsa Lake and Wistaria Post-offices. There is a school at Wistaria.

In spite of the remoteness from the railroad, this district has shown more progress during the last few years than most parts of the Francois-Ootsa Lake District and the settlers seem quite satisfied with their prospects.

My work in this neighbourhood consisted partly of the running of centre lines in previously surveyed lots and partly of the survey of Crown lands. The new area surveyed, 1,700 acres, lies midway between Ootsa Lake and Francois Lake. A fair proportion of the land surveyed is good hay land and quite a number of acres could be cleared at a very reasonable cost. Wild hay has been cut on this land for several years by settlers in the vicinity.

North of Burns Lake.

On completion of the surveys in the Wistaria District the party moved back to Burns Lake, and after replenishing supplies, etc., headed north to carry out surveys between Burns Lake and Babine Lake; consisting of the triangulation of Taltapin and Augier Lakes, traversing of Augier and 15-Mile Creeks, the tying-in of previously surveyed lots in the locality, and the survey of Crown lands suitable for settlement.

Taltapin Lake.

This lake was found to be 10 miles long, with an average width of about three-quarters of a mile. It lies in a north-west and south-easterly direction at an elevation of 2,700 feet above sea-level. Some 700 acres of land have been surveyed at the west end of the lake, but the land is of practically no value for agricultural or any other purpose.

Augier Creek flows in at the west end and another fair-sized stream comes in at the east end of the lake. The hills on both sides of the lake are rough and broken and not an acre of land worth while surveying for settlement was seen anywhere. On the south side the hills have a dense growth of spruce and pine timber of apparently good quality. From the west end and extending down the lake for 3 miles is a high ridge which drops very steeply to within a short distance of the shore. This steep and rocky slope is partly open and partly covered with a scrubby growth of poplar and willow. The balance of the north shore is mostly timbered with pine of no commercial value.

The lake has the reputation among the Indians of being one of the best fish-lakes in the district, but owing to the lack of boats and canoes on the lake we had little chance of ascertaining the truth of this assertion, as the two rafts which we built for moving down the lake were too slow for trolling and it was rather too late in the season for fly-fishing. No big game was seen, although, judging by the number of tracks, there must be quite a few moose ranging up and down the lake, also deer and bear.

15-Mile Creek.

About 3 miles down from the west end of Taltapin Lake, 15-Mile or Anderson Creek, flowing in a north-westerly direction, drains Taltapin Lake into Babine Lake. This creek is some 8½

miles long. For the first 4 or 5 miles it has but very little fall and is more of a lake than stream. The lower 2 miles is nearly all rock canyon with a drop of some 350 feet. At the mouth of the creek the Dominion Hatchery has a cabin and salmon-traps, and a considerable amount of spawn is gathered here every season and taken to the main hatchery at the lower end of Babine Lake.

About 2½ miles up the creek, on the west bank, two lots of 160 acres each have been surveyed. These lots were tied in to the traverse, as were also the surveyed mineral claims farther up the creek. The Taltapin Mining Company's buildings are situated on the west bank of the creek some 3 miles up from the mouth. Mr. Anderson, who lives here in hopes of a rise in the price of silver and reopening of the mine, grows the most wonderful potatoes and other vegetables in his garden-patch, but from an agricultural point of view this part of the district has, in my opinion, no chance of development, and, as on Taltapin Lake, no additional land was surveyed by me.

The creek has an all-year flow of water sufficient to generate all the power necessary should the Taltapin Mining Company ever open up in earnest.

Augier Lake.

The north-west end of this lake is some 2 miles east and 4 miles south of the Babine Lake Landing. The length of it is a little over 6 miles and the width averages about half a mile. The lake lies at an elevation of 2,800 feet above sea-level in the usual north-west and south-easterly direction and drains in a south-easterly direction into Taltapin Lake. The distance between the lakes is 5 miles.

No land has been surveyed on the lake, and, with the exception of a very few acres on the north shore about 2 miles down, there is no land suitable for settlement. The hills on both sides of Augier Lake are high and rough from the head of the lake to about half-way down, from whence they taper off towards the outlet, where the country has a level appearance. The south side is densely timbered with pine and spruce, but very little of it appears to be of any value for commercial purposes. The hills on the north side for about 3 miles down are very rocky and but sparsely timbered with scrub poplar and willow; the remainder of the north shore is timbered with pine, with some scattered poplar and spruce here and there.

Pinkut Lake, which lies at an elevation of about 2,900 feet above sea-level and parallel to Augier Lake, drains into the latter. Pinkut Lake is a little less than 5 miles long and some 3 miles distant in a south-westerly direction from Augier Lake.

Crown Lands surveyed.

At Big Foot Lake, about 9 miles north of Burns Lake by road, one lot of 160 acres was surveyed, and between this and Burns Lake 2,080 acres were surveyed before I closed down field operations for the season. The land is not exceptionally good, but it is easily accessible by road either from Burns Lake or Decker Lake. Three of the quarters surveyed embrace land which would have been filed upon before this had it been surveyed and open for pre-emption. On some of the land there are patches of tie-timber which is now being cut by Mr. Hanson's camp, located just outside my surveys.

Roads.

A Government road leads from Burns Lake to Pinkut Lake Landing, a distance of 12 miles. From this landing there is a trail to the lower end of the lake, a distance of some 4 miles. From this latter point the Government road continues for about 6 miles to Babine Lake Landing. There is a great amount of traffic over this road both during the summer and winter months. In the summer-time wagons and loads have to be taken by boat from Pinkut Landing to the lower end of the lake and the horses driven down over the trail, which, of course, is a great drawback to any one freighting or travelling over the route. From about a quarter of a mile south of Pinkut Landing a winter road 12 miles long and built by the Taltapin Mining Company leads to the mine on 15-Mile Creek. A pack-trail was cut out by my party this fall from Augier Creek Crossing down to Taltapin Lake, a distance of 4 miles.

General.

So many reports have been written and published covering the district in general by various Government officials, as well as others, that but very little will be said by me this time.

The district, in my opinion, has a bright future ahead of it, and in spite of all the complaints and kicking one hears from would-be farmers it forges ahead, in support of which I may state that this year alone three new post-offices have been opened, two more promised, and four or five schools built. The real settlers, both old-timers and recent ones, realize the possibilities of the district for dairying and mixed farming, and feel quite confident that the day will soon come when activity and prosperity will be general throughout the district. The Government, through the Land Settlement Board, assists farmers in securing pure-bred dairy cattle on reasonable payments. Compared with other parts of the Central Interior, the Francois-Ootsa Lake District has been little advertised to the outside world, but, in spite of this, I believe the district has received more *bona-fide* settlers during the last three years than any other part.

Roads throughout the district are continually being improved by the Public Works Department, and a steam-shovel was brought in this spring which is doing wonderful work, and even the most pessimistic have to admit that now it is only a matter of a little more patience and good roads will be an accomplished fact. What is now needed is good settlers and lots of them. Good land can be bought at very reasonable prices and terms. The Land Settlement Board's prices vary from $3 to $15 per acre and comprises some of the best land in the district.

The Dominion Telegraph Line has this season extended their Francois Lake branch line through to Ootsa Lake with the intention of continuing it to Wistaria and the west end of Francois Lake, connecting up with the line built out from Houston some years ago. The cable across Francois Lake has as yet not been laid. However, it is expected that the cable will arrive in time to get it down before the lake freezes over.

A Prince Rupert firm has secured a tie contract on Francois Lake this winter. The ties will be hauled down to the lake-shore on the snow, and as soon as the ice goes out in the spring they will be towed down to the lower end of the lake, where they will be turned into the Stellako River to be picked up again near Fraser Lake, where this river flows under the Grand Trunk Pacific Railway. This contract will create quite a pay-roll among the people on the lake and may develop into an extensive industry, as almost unlimited quantities of tie-timber exist on both sides of this lake.

With the exception of Mr. Barker, who is successfully operating a fox-farm on an island in Ootsa Lake, the fur industry has as yet not been developed in this district. Mr. Anderson, on 15-Mile Creek, has succeeded in breeding marten in captivity, which, I am told, no one has done before. Whether he will make a success of it has yet to be seen. In the outlying portions of the district trappers are busy every season and some very good catches are brought in.

I have, etc.,

V. SCHJELDERUP, B.C.L.S.

SOUTH OF PEACE RIVER BLOCK, PEACE RIVER DISTRICT.

BY A. R. BARROW.

POUCE COUPE, B.C., August 29th, 1921.

J. E. Umbach, Esq.,
Surveyor-General, Victoria, B.C.

SIR,—The area allotted to my survey was that in the vicinity of the Interprovincial Boundary, south of the Dominion Peace River Block. My previous examination of the Peace River District had been only west of the area in question, with which I was not personally acquainted, and the little information concerning it, other than verbal, was contained in reports of the Minister of the Interior, much of it unpublished. In this connection I am much indebted to the officers of the Dominion Lands Survey, both at Ottawa and locally in the field, and particularly to Mr. Cautley, for their ready response to my inquiries.

The verbal information acquired I found to be unduly optimistic and the results of the season's work are distinctly disappointing. I think it probable that the information concerning the country was very slight when the 120th meridian was adopted as the Interprovincial Boundary, but that boundary proves to be, south of Swan Lake, also the boundary between large areas of land suitable for settlement, and small patches of land, adapted to the use of trappers and hermits, which may be cultivated, but which are surrounded by badly burnt country, windfalls, scrub timber, muskegs, and small lakes. The wagon-tracks to this boundary

land are all from settlements in Alberta, and I noted that uniformly the townships in Range 12 were desirable and in Range 13 less so, deteriorating as one travelled west, until at the boundary the land is nearly worthless. The settlement towards the boundary must be from the east and is likely to be slow, which circumstance condenms the country to isolation. Settlers west of the boundary, meanwhile, would have no claims for roads on the Alberta Government, which only could afford these necessities.

For the first time since 1902 I used wagons for transport and found that the greater distances travelled and time occupied were more than offset by saving the expense of a pack-train. Personally, I used the Boundary Trail and was able to get a good idea of the country to the west. This boundary, which is used as a pack-trail, traverses many bad mud-holes between the Wapiti River and Swan Lake, but north of that lake it is practically dry to the crossing of the trail from Pouce Coupe to Fish Lake in Township 77. The windfall south of Red Willow River is all that Mr. Cautley describes it.

At the Wapiti River no land could be found to attract the most hopeful settler, and in any case the elevation is probably about the limit of settlement in these latitudes.

At the Big Slough, Gunn's pre-emption (P.R. 3130), was found the best growth of slough-grass, the only product of the country, in view of the fact that it could be cut in most years, judging from appearances, but the pre-emption covers the available land. The country has afforded some large catches of fur in former years. The nearest base for supplies is Rio Grande, 18 miles.

The land reported by Mr. Cautley north of the Red Willow River was not surveyed. It is a small gravelly flat, backed by a strip of good land on the bank, 5 chains wide, beyond which is a dismal muskeg.

The land at Kelly Lake resembles the Big Slough, as also does Crooked Lake, which latter is, however, even in this dry season, too wet for mowing hay by machine. The settlers use Hythe as a base of supplies. At Crooked Lake I found only two men who were removing to some more favoured spot. They had squatted on a small lake 3 miles south-west, 2 miles beyond which is a tributary of the Cutbank River, in which grayling are plentiful and confiding. This is the first occasion on which I have found edible fish in the Cutbank watershed.

Lots 254, 255, and 256, north of Crooked Lake, are worthless for settlement and were surveyed only to complete Mr. Campbell's operations. It is significant that the surveyor of the adjoining Township 74 left the portion abutting on these lots unsurveyed.

On Lots 239 to 244, north of Swan Lake, it was pleasant to find dry ground. Generally speaking, the land is good for summer grazing, the value of which is increased by the adjoining Township 76 being a forest reserve. The land is unattractive for settlement owing to the want of water, with the exception of Lot 242, for which there is an application to purchase.

The topography of the country travelled over is outlined in the Dunvegan and Wapiti Sheets of the Dominion Sectional Map, 1917.

The outstanding feature of the exceptional weather, which occurs every season, is that it was exceptionally pleasant during the short time I was employed. The men of the party gave excellent service and the woman cook was an unqualified success.

I have, etc.,

A. R. Barrow, B.C.L.S.

NESS AND BEDNESTI LAKES, CARIBOO DISTRICT.

By J. F. Campbell.

Prince George, B.C., November 4th, 1921.

J. E. Umbach, Esq.,
Surveyor-General, Victoria, B.C.

Sir,—Surveys consisted of subdivisions of reverted lands in the vicinity of Ness Lake, surveys of vacant land near Bednesti Lake, and subdivisions of a few sections of reverted land on the Nechako River between Prince George and Isle Pierre.

Ness Lake.

Ness Lake lies 30 miles west by rail from Prince George and 6 miles north of Isle Pierre on the Nechako River. A road leaves the north bank of the Nechako River opposite Isle Pierre

Station, on the Grand Trunk Pacific Railway, and winding up a draw for three-quarters of a mile reaches the level of a plateau that extends north to the lake. The road runs northwards for 8 miles and ends near the western extremity of the lake.

The lake, beautifully situated between gently sloping banks, has a firm sandy gravel bottom and is 5 miles in length. The width varies from three-quarters of a mile to a few hundred feet where it winds through narrow passages. On first observation the size of the lake is deceptive, due to its many bays and narrow channels, and appears much smaller than is actually the case.

The area locally known as the Ness Lake District extends back from the lake a distance of from 3 to 4 miles, the general height of the land being 300 feet above the Nechako River. The elevation of the Nechako River at Isle Pierre, on the Grand Trunk Railway, is 2,082 feet above sea-level. The character of the country in this locality is distinctive from that usually encountered on the Nechako Plateau.

The first noticeable feature is the exceptionally heavy undergrowth of red willow, alder, and berries of different varieties. This undergrowth, which grows to a height of from 4 to 8 feet, is much entangled and matted and travel across country for this reason is at times extremely difficult. The heavy nature of the underbrush extends 3 miles to the south and 2 miles to the west, while to the north and east it is much lighter.

Another noticeable feature is the flatness of the country. This is usually a good feature, but in this case it is often difficult to obtain proper drainage, and in the spring the surface water lies in the depressions longer than is generally the case.

It was also noticed that there is no visible outlet to the lake, although the water-level at present is very little higher than it was some years ago, the higher water-level possibly being due to the heavy rains of the past summer. This tends to give the impression that there is an underground outlet to the east, where the ground is swampy for a considerable distance back from the lake.

The soil to the south and west is a deep black loam, 2 to 4 feet in depth, with a clay subsoil, while to the north and east it is more of a chocolate-coloured loam of the same depth with a clay subsoil. On top of the soil the leaf-mould is 2 inches in depth.

The general timber is poplar and cottonwood 4 to 18 inches in diameter, an occasional lodge-pole pine and spruce in the swampy areas. When this land is cleared of the timber it is ideal for hay and oats, and from the indications of the growth of wild berries should produce a good berry yield. Wheat has been tried on the cleared land, but in all cases was sown too late in the summer to get a fair trial and was not a success.

There is considerable land that has the appearance of marshy muskeg, but when the mossy top is burnt off and the land drained and the soil allowed to dry, good crops of hay can be grown. Where the land is marshy a number of settlers are carrying out quite extensive drainage schemes, and areas of this drained land when put under crop have returned many times the value of the labour expended.

The majority of the settlers are recent arrivals from the Prairies, where lack of moisture in their particular district has made crop-failures for a number of years. They are well satisfied with the new location, although in some cases they were not familiar with clearing, and the progress made at first was slow; they have now got into the proper swing and expect to have small areas under cultivation next year.

The district is fairly well supplied with roads. Besides the road from Isle Pierre there is a new road building from Prince George to the east end of the lake, where it is now slashed, and from there will follow the southern shore west. This road will make the distance 18 miles to Prince George from the east end of the lake. There is another road branching from near the east end of the lake, and, going southerly, reaches the Nechako River at Miworth, on the Grand Trunk Pacific Railway. A Government ferry across the Nechako is in operation at this point and carries teams, wagons, etc., free of charge six days in the week, while on Sundays there is a charge of 25 cents per person and 50 cents per team.

Isle Pierre.

Isle Pierre is 30 miles west from Prince George on the Grand Trunk Pacific Railway. At this point the hills on either side of the Nechako River contract, and where the river cuts through a short canyon is formed, called Isle de Pierre Rapids. The name is taken from a small rocky island that lies near the right bank of the river, midway through the rapids.

On the north side the hills rise abruptly for 300 feet, while on the south there is a bench a quarter of a mile wide which the Grand Trunk Pacific Railway traverses. From this narrow bench the hills rise by a series of benches towards a rocky knoll 800 feet above the river and lying 3 miles to the south-west. This knoll is a prominent landmark and was used in the days before the railroad as a guiding mark.

Running back from the river on the south or right bank are draws that have been formed by the action of the water from the melting snows in the spring of the year. These draws or gullies are 10 to 15 chains wide at the bottom and gradually ascend from the river until the top of the bench is reached. The soil in the draws is very fertile and excellent crops of hay and oats are raised by the owners. One of these bottoms directly behind Isle Pierre Station is cultivated to the extent of 15 acres under oats, and the crop when seen in the latter part of July was 3 feet in height, with a good head. With the exception of the river-bottom bench, which is a quarter of a mile wide, and the narrow draws, there is no agricultural land until the top of the bench is reached, about 300 feet above the river. The bench on top is fairly level and the timber, principally lodge-pole pine and small poplar, is scattered. Some years ago a fire travelled the country and the second-growth poplar is very open and the clearing light.

The soil on the river-bench is a sandy silt, with a heavy growth of wild grasses and strawberries. On the upper levels the soil is more of a chocolate loam, with a mixture of sand where the recent fire has destroyed the top soil. In many places, especially towards the south-west, rock-outcrop is noticed, and the agricultural land in this vicinity, with the exception of the actual river-bench, is limited.

The few farms along the river have generally had a successful year and the crops have been up to standard. The heavy rainfall experienced in the late summer destroyed part of the hay-crop, but with this exception the farmers are well satisfied with crop conditions.

Bednesti Lake and Vicinity.

Bednesti Lake, one of the many pretty lakes in this district, is 30 miles west from Prince George, midway to Vanderhoof. The Grand Trunk Pacific Railway is 6 miles to the north, while the main trunk wagon-road between Prince George and Fort Fraser parallels the lake a mile to the north. Two short wagon-roads branch from the main road, one reaching the lake near the western end and the other about midway along the north shore.

The lake is 4 miles in length and has a hard sandy bottom. Berman Lake, half a mile to the east, is connected to Bednesti Lake by Moses Creek, a stream 100 feet wide. A heavily loaded boat can be rowed from one lake to the other.

Bednesti is on the old Stony Creek Trail, which in days before the building of the Grand Trunk Pacific Railway was the main artery of travel between Fort George and Fort Fraser. Along the shore of the lake are many open spaces that have been cleared by campers in past and recent years, for Bednesti is celebrated for the size and number of trout caught in its waters. The Indian name for the lake, Bednesti, means big trout, and it still justifies its name.

A series of sharply pitched rises or hog-backs, a quarter to half a mile wide, parallel the north shore of the lake. These at intervals branch into the lake, forming gravelly spits a few feet wide and a few hundred feet long. This ridge of hog-backs starts about midway on the north shore of the lake and ends 2 miles to the east. This narrow strip of rough country lies between the main wagon-road and the lake and is more or less gravelly. On either side the country is level and wooded with scattered lodge-pole pine, small poplar, and an occasional fir.

The land rises from the lake towards the north with a gentle slope and is fairly lightly timbered with pine and poplar, although there are patches where the timber is rather dense in growth but small in diameter. The soil is a chocolate-coloured loam, with gravelly knolls scattered throughout the area. The slope extends back for a mile, when the country levels out until the descent into the Nechako Valley is reached.

To the south of the lake the ground rises for 50 feet and then extends southwards with slight undulations until the base of Bobtail Mountain is reached. Along the lake-shore is a fringe of timber a few hundred feet in depth, while beyond this an old burn extends for many miles. This burn has cleared the country of its previous light growth of timber without injuring the soil to any great extent, although in any place that gravel lay beneath the top soil this is now exposed by the action of the fire. There are many meadows, both dry and marshy, throughout the burn, which sustain a heavy growth of wild hay.

Bednesti Lake drains to the east by Bednesti Creek, which empties into the Nechako River a few miles west of the Chilako River. This creek is remarkable for its tendency of disappearing underground for half a mile or more, and then reappearing, flowing stronger than ever. The old creek-bed is well defined, but no water has passed along it for many years and it has now grown up in willows.

The land bordering the creek and for a quarter of a mile on either side has a luxuriant growth of wild grasses and vetch. A mile from the lake the creek-valley widens and there are many small hay meadows 5 to 10 acres in size. Two miles east from the lake, and also to the south, hay meadows are encountered varying from 5 to 40 acres. On most of them hay is cut by the settlers in the immediate vicinity, and in winter, when the snowfall is light, they are used for winter pasture.

The country is rapidly being settled by farmers who are working hard and intend to make a success. Many of them have from 10 to 40 acres under crop and have a ready market at hand, either in Prince George or Vanderhoof. On the farm of A. J. Abery, 2 miles from Bednesti Lake, a tractor is used for ploughing and other farm-work. Although he has only been in occupation for eighteen months, half a dozen buildings are erected and 15 acres under cultivation. Two miles farther to the east H. B. Mason has 40 acres under crop, besides a dozen head of cattle in pasture. He has been in occupation for two years and is now shipping butter, beef, etc., to both Prince George and Vanderhoof.

There are many excellent pieces of land that would make good farms, but the land has to be carefully selected, as the country is patchy and the quality varies in a very short distance.

The road from Prince George that passes through this area is in first-class condition, both for heavy transportation and motor traffic. Two roads branch from the main road and run to the railroad, one to Nichol Station and the other to Bednesti Station, and with these the farmers have very little difficulty in getting their produce to market.

TRANSPORTATION.

The main trunk roads west from Prince George are in good condition during the summer. In the spring and late fall the melting snows and heavy rains soften the mud top and heavy vehicle traffic cuts the road into deep ruts. This makes travel in the spring and fall of the year rather difficult for heavy loads, but in the summer and early fall the roads are in first-class condition.

A road runs from Prince George west 70 miles to Vanderhoof and continues to Fort Fraser. This road parallels the Nechako River at an average distance of 6 miles to the south, and is used a great deal for motor traffic between towns and by the settlers when hauling their produce to market. During the construction of the Grand Trunk Pacific Railway this road was used for the transport of material for the railroad, and the bridges and embankments are built to withstand the heaviest loads.

The principal means of transportation is the Grand Trunk Pacific Railway. At most stations roads extend back to the main roads that parallel the river. At Miworth and Hulatt there are Government-operated ferries that transport teams and wagons free of charge across the Nechako River. At other points there are boats that carry passengers across the river.

TIMBER.

There is very little merchantable timber lying along the Nechako River. The only exception to this is tie-timber of lodge-pole pine. Most of the timber that could be used for ties is to the north of the river and some distance back, and to transport the ties for a few miles and then cross the river entails too much expense. There are a few isolated sections of good timber for milling purposes near Bednesti Station, on the Grand Trunk Pacific Railway, but not enough to pay for installing a mill.

GAME AND FISH.

Game throughout the district is very plentiful. The moose are increasing rapidly and were frequently seen, especially near the roads which they use for travel. It is within the past ten years that moose have come into the district in any numbers. Previously they inhabited the country farther to the north and east, but now that the Indians are few in numbers and do little hunting the game is rapidly coming south. The deer are plentiful, but are much more difficult to hunt than the moose, as they are wilder and more apt to take fright at the least noise.

In most of the lakes camped by fish were easy to catch. Ness Lake has no trout, but plenty of ling that grow to a fair size. Bednesti Lake is well supplied with rainbow trout that readily take the fly. Catches of over a hundred trout have been made in this lake over the week-end. The Nechako River can be fished successfully at certain stages of water and fair catches made. Occasionally sturgeon is caught, sometimes weighing as much as 300 lb., but this is more the exception than the rule.

I have, etc.,
J. F. Campbell, B.C.L.S.

MISCELLANEOUS SURVEYS IN CARIBOO DISTRICT.

By Rupert W. Haggen.

Quesnel, B.C., November 3rd, 1921.

J. E. Umbach, Esq.,
Surveyor-General, Victoria, B.C.

Sir,—Surveys were made during the past season in the following localities in the Cariboo District: Blackwater, 10-Mile Lake, Quesnel, Big Lake, Beaver Lake, Horsefly Lake, and Moffat Creek. The work consisted largely of the subdivision of old surveyed lots into 160-acre parcels, involving the retracement of old lines, which are now overgrown in most cases.

Blackwater Section.

Eleven lots were subdivided near the mouth of the Blackwater River, which enters the Fraser some 45 miles above Quesnel. The northerly of these sections lie partly on very steep hills which border the Blackwater Valley and can hardly be considered as desirable for settlement, although one pre-emptor, who has been in the district a number of years, has located in Lot 3591, on a bench near the river, at the mouth of the Tako River, a tributary of the Blackwater.

The Blackwater itself is a large stream, draining from the Euchiniko and Nazko sections. The Yukon Telegraph Line and the road from Quesnel to Vanderhoof and Prince George cross the river about 15 miles from its mouth. From the crossing the stream is a series of cataracts, flowing in a deep, rocky gorge. The hillsides are wooded with a growth of gnarled fir, with occasional small benches covered with poplar or jack-pine.

Vandenberg's pre-emption lies on a trail which was constructed some years ago on the north side of the Blackwater. On either side it is so steep as to be almost impassable for horses, even though lightly packed, and it is very difficult to see how the great obstacle of transportation is to be solved; any road-construction would necessarily be expensive. My own opinion is that settlers would be very unwise to locate in this canyon.

The surveys south of the Blackwater lie on a rolling bench following the Deep Creek Valley. A trail was built, leaving the Quesnel–Blackwater Road at the Deep Creek Cabin, a shelter-cabin built for linemen on the telegraph-line. Along the westerly sections there is a good percentage of very fair land, in some places fairly open, in others wooded with a growth of poplar from 2 to 6 inches in diameter. The Deep Creek Cabin is about 33 miles from Quesnel, and these lots lie from 5 to 9 miles north of the cabin.

The soil here is generally a clay loam of considerable depth and appears to have good productive possibilities. It is unlikely that irrigation would be necessary for general crop production; water could be obtained from Deep Creek, but, as the benches lie between 200 and 300 feet above the valley, the conduit would be long and would probably cost more than it would be worth. Domestic water should be obtained easily; there are some springs and indications are that wells would strike water at shallow depth.

As is general in the country north of Quesnel, the country has been fire-swept some years ago and the present bush is all second growth. There is considerable brulé. Towards the break of the Fraser Valley the land becomes very rugged, with a tangle of brulé and standing snags. Here the soil is very poor.

As there are no residents in this section, no data were obtainable as to rainfall or summer frost. However, it is reasonable to say that depressions would be more or less subject to frost, while uplands and slopes would not be.

The Blackwater River is a favourite spot for trout-fishing and splendid catches are made. In Deep Creek there are brook-trout. Beaver are numerous on Deep Creek and springs. Bear and deer are quite plentiful.

In the future, although not immediately, it is quite possible that this section may be in demand for a mixed-farming settlement. At the present time settlers can obtain land of much better quality nearer to markets.

VICINITY OF QUESNEL.

Three lots on the west side of the Fraser River, opposite Quesnel, were subdivided. Most of these parcels have been pre-empted. Some of them lie in the valley of Baker Creek and contain small patches of fertile land in the creek-bottom. The soil is a sandy loam. The banks of the creek are high and precipitous and the adjacent land rough. The vegetation is cottonwood, with considerable brush.

There is insufficient land on these parcels to enable their being developed into self-supporting farms, but undoubtedly good garden produce can be grown. They lie within 1 to 3 miles of Quesnel and are consequently within reach of a market for their produce. Two of the parcels lying on poplar benches north of Baker Creek should be good pre-emptions. Irrigation is unnecessary and there is ample domestic water available.

TEN-MILE LAKE.

Five sections were subdivided at 10-Mile Lake, which lies on the Pacific Great Eastern Railway 10 miles northerly from Quesnel. The altitude of this land is from 2,400 to 2,800 feet. From 10-Mile Lake the land rises in a series of benches to the east. A forest fire years ago destroyed the original forest, which was heavy fir, and in most places burned the humus in the soil, leaving the subsoil, gravel or hard-pan, exposed. In the course of time a fairly dense second growth of poplar and pine has sprung up and a shallow humus developed on the surface. Several pre-emptions have been taken up in this locality, mostly on a big swamp lying along the railway, and efforts are now being made to reclaim this swamp.

On the benches the cost of clearing would be from $40 to $60 per acre. It would seem doubtful if the land is worth clearing at the present time, although it may prove productive. A rank growth of peavine and weeds indicates the surface humus to be quite rich, but one is diffident about declaring that the land is suited for farming until some pioneer settler proves or disproves it by actual test.

The ground should be free from frost, there is a good average precipitation, and it lies adjacent to the railway, three very favourable factors.

Two miles east of 10-Mile Lake the summit of the divide between 10-Mile and the Cottonwood River is reached, and the final descent into the Cottonwood is very steep. At the present time considerable prospecting is being done for placer and dredging ground on the Cottonwood, and good values have been found in the gravel benches above the river; whether the ground has been prospected sufficiently to determine its suitability I cannot say. However, it is quite within the realms of probability that gold-dredging will within the next few years be undertaken on a large scale in the Cottonwood Valley. All who have tested the ground seem optimistic. The installation of such a plant is, however, very expensive, and in these days of money tightness none but very wealthy syndicates can install it.

BIG LAKE, BEAVER LAKE, AND PEAVINE RIDGE.

This section contains a large area lying within the drainage-basin of the Beaver Valley, including the tributary valley of Beedey Creek, Big Lake Creek, and Peavine Ridge Creek. It lies within reach of the 150-Mile House–Quesnel Forks Road, 24 to 35 miles from the 150-Mile House, 10 miles farther from the Pacific Great Eastern Railway at Williams Lake. A fair road from Macalister Station, on the Pacific Great Eastern Railway, enters the area at Beedey Creek, 19 miles from Macalister; while another road, from Big Lake to Soda Creek, enters it at Marguerite Lake, 18 miles from Soda Creek.

The area comprises a rolling plateau, its elevation being between 2,500 and 2,800 feet. There is no merchantable timber within the area, although on many ridges there is fir of fair size. On about 30 per cent. of the whole area there is a growth of light poplar, which can be cleared at a cost of from $20 to $50 per acre, varying in the different spots. In parts there is jack-pine and spruce. Over the whole area there is a luxuriant growth of peavine, fireweed,

and vetches. This has been of great use to the settlers, and I have seen them cut enough of this for hay to winter their stock; furthermore, the stock do well on it and are turned out in good shape. Throughout this area there is a good proportion of deep loam soil. The ridges are gravelly. Timothy, clover, grain, and vegetables of the hardier varieties grow well, the growth being really prolific. Summer frosts are apt to do damage to susceptible crops in the depressions, but on the uplands or slopes they do not occur.

One settler, Mr. McCuaig, who located on the summit of the ridge in 1919, had this season 60 acres in crop. Most of the settlers are getting their places in shape for production.

While there is not a great deal of surface water in the area, wells yield water at shallow depth. There is ample rainfall and the soil is retentive, irrigation being quite unnecessary.

The whole section, of which the area under review is a portion, extending from Miocene, on the Horsefly Road, to Horsefly and Horsefly Valley, Beaver Lake and Peavine Ridge, is, I consider, the largest area of fairly contiguous farming land south of the Grand Trunk Pacific.

It has in the past been used to some extent as a stock country, but is not very suitable, the winter season being too long, involving great expense for winter feeding. Throughout the area there is magnificent summer range of soft leguminous feed, but this is usually badly perished in October, and the feeding of stock is usually necessary from the early part of November till the end of April.

A number of settlers have located within the area during the past two years and are well satisfied with it, but all agree that it is a mixed-farming, dairying country. It is hoped that in the near future a creamery may be established at Williams Lake or some fairly central point.

When dairying is established as a base for the mixed-farming industry there is no doubt that the country will develop very rapidly into one of the best mixed-farming areas within the Province.

A creamery has been established at Quesnel during the past season and has done well. To the small farmer it is a great boon, as the semi-monthly cheque enables him to keep his farm going. In the past these men have had to keep their farms; now their farms keep them. It is to be hoped that as a further development a bacon-curing industry may be established within the district during the next few years.

At Twin Lakes, near Big Lake, some placer-mining has been done in the past, but no rich strike made. This year some further investigation seeking an old channel has been made. Throughout the area there seems to be a strata of limestone and there are several limestone hills.

Roads of good standard will be required within a short time to facilitate the marketing of produce; the present roads have been, as a rule, built along the lines of least resistance for some temporary purpose; the Horsefly and Quesnel Forks Roads are not of high standard.

Within the area there are post-offices at Horsefly, Miocene, Ochiltree (Rose Lake), and Beaver Lake; public schools at Horsefly, Miocene, Rose Lake, Beaver Lake, and Big Lake. The post-offices are served by weekly stage from Williams Lake.

Many of the settlers have depended in the past on a grub-stake from trapping. Horsefly, formerly Harpers Camp, is the centre from which most of the trappers work, and in the past a great deal of fur has been brought there; the chief pelts being marten, beaver, and musk-rat. With the falling market of fur and close season on beaver, many are abandoning trapping, and this greatly reduces the revenue of the country. Beaver are now very plentiful and much annoyance to surveyors is caused by their handiwork.

HORSEFLY BAY, QUESNEL LAKE.

Two amendment surveys were made on lots near the mouth of the Horsefly River, 15 miles up Quesnel Lake from the outlet. A dam at the outlet has kept the lake-water raised over flats at the mouth of the Horsefly for some years. Last winter a portion of this dam was blown out, as it was becoming unsafe under high-water pressure, and the flats at the mouth of the Horsefly have become accessible. There is only a small area of good soil here, the balance of the flats being sodden with water.

A road from Horsefly follows Horsefly Valley to within 3 miles of Horsefly Bay, and a foot-trail, pretty well filled with logs, extends to the bay. This is the usual route of parties going up Quesnel Lake.

Apart from the flats at the mouth of the Horsefly, the country is hilly and densely wooded with hemlock, fir, spruce, and cedar.

Quesnel Lake is a good trapping-ground. Within the lake splendid catches of trout are made.

MOFFAT CREEK.

Four lots were surveyed for intending settlers in the Moffat Creek Valley, from 8 to 10 miles from Horsefly, on a road which extends from Horsefly to Lac la Hache. Originally this road was used for hauling supplies to Horsefly Mine and was extended as a sleigh-road to Bullion via Polley and Bootjack Lakes. Years ago the latter section fell into disuse and is now impassable even for a saddle-horse.

In Moffat Creek Valley there are numerous wild hay meadows and some willow bottoms and poplar-flats. Some settlers have been there for several years and seem well satisfied. The soil is not of good quality as a rule, and the range is much poorer than in other sections of the district; however, the range is within easy reach of the valley. Lac la Hache, 37 miles distant, is the nearest point on the Pacific Great Eastern for settlers along Moffat Creek.

Beaver and musk-rat are plentiful along this valley. Game of other varieties does not seem to be plentiful, and there are few fish in the creek.

MOUNTAIN HOUSE.

Some ties were made from unconnected lots on the main Cariboo Road and Quesnel Forks Road to the old surveys at the Mountain (158-Mile) House. All land of any value here has been surveyed and taken up years ago. The ties run through fir and jack-pine on high, gravelly land.

GENERAL.

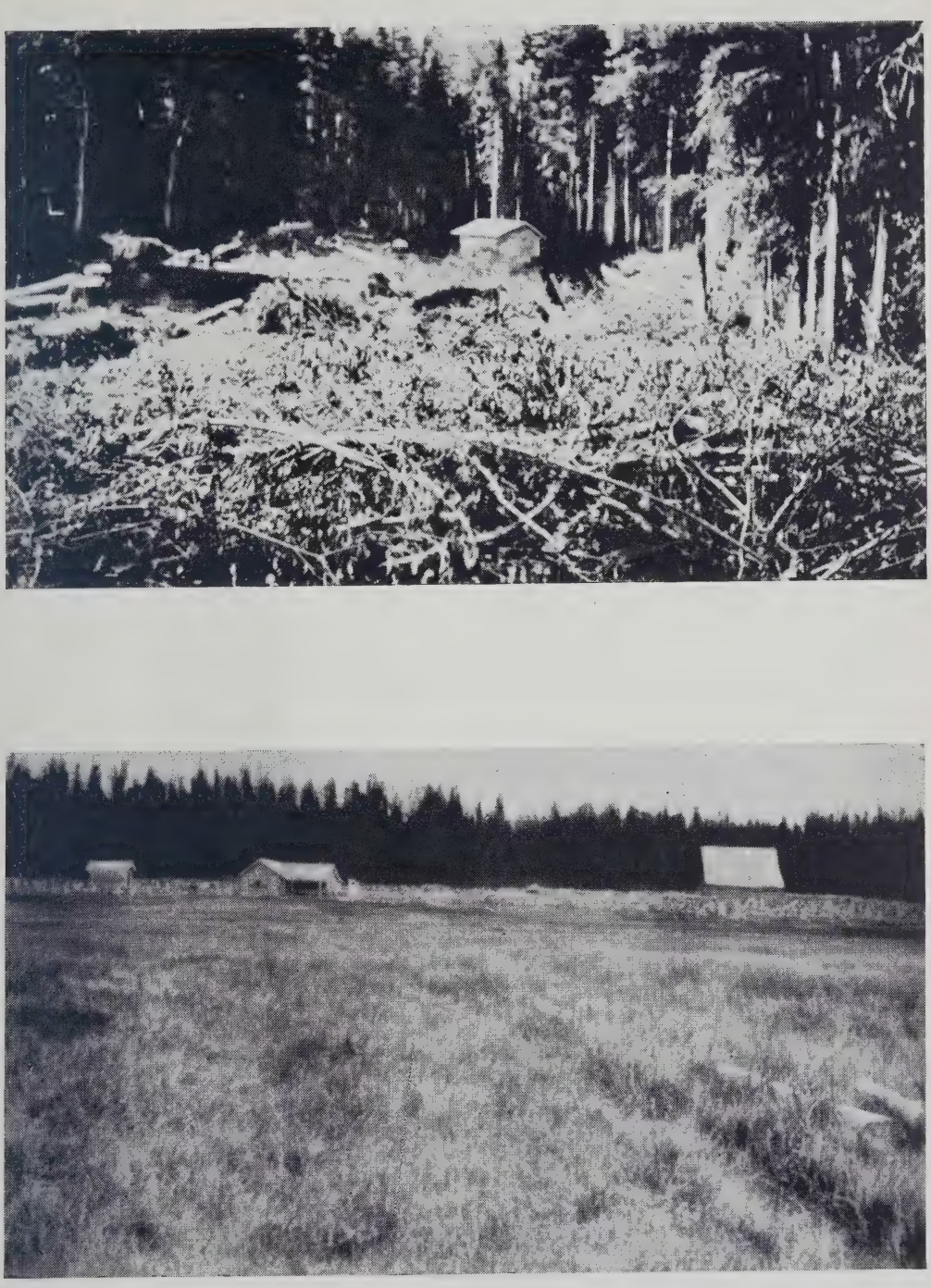
As was to be expected, the opening of the Pacific Great Eastern Railway has caused a considerable number of new settlers to come into the country. On the other hand, it has changed the conditions extant since the building of the Cariboo, when all mails, passengers, and supplies had to be hauled by horses over the long road from Ashcroft. During those years the ranchers did well raising horse-feed and the demand always equalled or exceeded the supply. Within very recent years hay has sold for as high as $80 per ton in Quesnel and oats at 6 cents per pound. Those farms which have not prepared for changing conditions are yielding little income to-day.

Of the new settlers who are coming into the section, a number have farmed on the Prairies and have come to the milder climate and more reliable conditions prevailing in this Province. These settlers, practical farmers, realize that the development of a farm involves labour; at the same time they know to what efforts it is best to turn their energies, and it is quite certain that most of them will make good. They have a definite object in view, know what steps it is necessary to take to reach their goal, and have some capital to tide them over the period of development, thereby having a great advantage over the settler who, lacking capital, must work out during a considerable portion of the year in order to exist. In the past a great many settlers pre-empted lands with the sole idea of doing the minimum amount of improvements, obtaining a Crown grant, and waiting for some one to buy them out. To-day the great majority of pre-emptors are taking up places because they want to develop farms.

Mining in the Cariboo has been continued on about the same scale as heretofore in the Barkerville section. On the Cottonwood River prospecting has been done. The Kitchener Mine at Keithley Creek has been hydraulicking and prospecting has been done in the vicinity of Cariboo Lake.

At Rose Gulch and Cedar Creek, near the outlet of Quesnel Lake, prospecting has been done on high benches and some very promising ground uncovered. One claim at Cedar Creek is yielding splendid returns at practically the grass-roots; up to the present, however, no data are available as to the probable extent of the auriferous gravel; it may be only a pocket or may turn out to be a big discovery.

The stockmen have had a very poor season. Beef to-day commands a price of about one-third of that prevailing two years ago, and is now selling at less than the cost of production on all but the most favourably situated ranches. Many of the newer ranchers, and especially the returned soldiers who bought places two years ago, can get no more for their 3-year-old



Making a farm in the Cariboo. Upper view shows first slashing and settler's cabin; lower, same land three years later.

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stock to-day than they paid for them as yearlings. The unprecedented slump in live stock is bringing about a very serious situation for them. One year ago the cattle-raising industry was considered as the most stable in the country; to-day there is none more unprofitable.

In so far as the Cariboo District as a whole is concerned, while it will have its vicissitudes, there can be little doubt that the next decade will see splendid development in mining and farming; and probably a pulp industry will be started. At times we are all inclined to become a little pessimistic, but the more I see of the district the more firmly I am convinced that it will more than justify its development.

I have, etc.,

Rupert W. Haggen, B.C.L.S., D.L.S.

NAZKO AND CHILCOTIN VALLEYS, CARIBOO DISTRICT.

By W. C. Merston.

Victoria, B.C., December 23rd, 1921.

J. E. Umbach, Esq.,
Surveyor-General, Victoria, B.C.

Sir,—I have the honour to submit the following report of my surveys in the Cariboo District during the season of 1921:—

I left Victoria early in June and travelled by the Pacific Great Eastern Railway to Williams Lake; then by a motor-truck to Alexis Creek, where I bought my first month's supplies. From this point I travelled by wagon and pack-horses up the Chilcotin Valley to Chezacut, and then to Nazko, where I picked up my second month's food-supply. My third and fourth months' food-supply met me on Upper Baker Creek, where I completed my season's work by following up Baker Creek to its headwaters, and thence continuing over the divide to the headwaters of Narcosli Creek, which I followed down to the Fraser River. During the season I ran 80 miles of tie-line, connecting 4,200 acres of open hay meadow.

Chilcotin Valley.

My first surveys were of three lots on the Chilcotin River, which completed the survey of vacant agricultural land in this vicinity. With the exception of a few scattered acres along the foot-hills, there is now no unsurveyed agricultural land in the Chilcotin Valley. I continued by way of the Chilcotin Valley to Chezacut, following a wagon-road up the Clinchintampan River, past Sucker Lake, and on to Aneko Creek.

The valley of the Clinchintampan contains the largest stretch of meadow country that was seen this summer. This valley is some 6 or 7 miles long, with an average width of about 1½ miles. In former years it was covered with brush, but this to a great extent has been cleared and now grows good hay. There is no vacant land in this vicinity.

Continuing from Sucker Lake, a wagon-road runs to Christie's meadow (Lot 3435). From here I ran a traverse-line to connect with my previous surveys in the Nazko Valley. Along this traverse I surveyed eight lots. The country is undulating and covered with second-growth jack-pine. Scattered among the jack-pine are depressions of various sizes covered with wild swamp-hay. The land between the swamp meadows is stony and of no use for agricultural purposes. A wagon-road connects Lot 3435 with the farthest of these meadows, which has been taken up by Mr. Christie. He has built a shack and barns and puts up hay here each year. Between Lot 3435 and the Nazko Valley there are approximateiy 850 acres of surveyed vacant land, all of which grows good wild hay and would be suitable for cattle-raising in a small way. This country lies at an elevation of 3,700 feet and is only suitable for cattle-raising. Good summer feed would be found near by in the Nazko Valley.

Nazko Valley.

On completing my surveys around Aneko Creek I moved to the Nazko Valley, where I surveyed seven lots.

With the advent of the Pacific Great Eastern Railway, giving easy and cheap transportation to Quesnel, many intending settlers are now coming in to the Nazko Valley. Whilst up to last June no new places had been actually taken up, five different parties were met who were seeking

homes in this part of the country. There is still much vacant land in this valley very suitable for cattle-raising in a small way.

The range along the valley is excellent and there is room for another 1,000 head of stock. The older settlers in this part of the country are prospering in spite of the slump in cattle prices.

Mr. Franklin, a local settler, has got out plans for the erection of a small sawmill to be operated by water-power from the Nazko River. The Harrington Bros., who are the largest land-holders in the valley, have just been joined by another brother, who has taken up a piece of land and has joined forces with his brothers in producing cattle.

I then traversed up Redwater Creek and surveyed two good quarter-sections on the way. These two quarter-sections are both mostly open and covered with good hay. At the present time cattle from the Nazko Valley graze here during the summer. The first of these two quarter-sections, Lot 9908, is locally known as Red Creek Basin. Its name is derived from its shape, which, with its gentle slopes, affords good early spring feed for cattle. At the head of this basin is a deposit of hæmatite, which I believe has been examined and reported upon by the Provincial Mineralogist.

While my party was completing the traverse to Redwater Lake, I was informed that "the largest meadow in the country" had just been discovered about 5 miles down the Baezaeko River from its junction with the Coglistico. I accompanied one of the settlers to this meadow and found it to be a long, narrow, S-shaped strip some 2 miles long, with an average width of not more than 10 chains. A tributary of the Baezaeko runs through it, cutting it up badly. Under the present system of surveys this piece could not be surveyed to advantage.

On completing the work in Redwater Creek Valley I moved by wagon to the Lower Baezaeko. A good wagon-road runs from the Nazko Valley, parallel to and some 2 miles south of the Blackwater River, to some hay meadows on the Baezaeko River. Two good parcels of bottom land were surveyed, which completed the survey of vacant agricultural land in this vicinity.

Baker Creek.

Leaving the Nazko, I travelled over the Nazko-Quesnel Wagon-road, which at this time (July) was in good condition and fit for a Ford car to travel over. On arriving at Puntataenkut Lake I turned south down a wagon-road which follows the western side of Baker Creek to some hay meadows about 5 miles from Tibble Creek. Two pieces were surveyed here, one of which has already been taken up by a settler in the neighbourhood.

From this point on I had to discard my wagon and use pack-horses. I procured these from the local settlers, who are mostly employed in raising horses and cattle. The settlement around Puntchesakut Lake, which is locally known as the Baker Creek Settlement, is going ahead rapidly. Three new families have settled in the locality during the last year and there are now sufficient children to start a school. With the aid of the Soldiers' Settlement Board, two families have bought herds of cattle and expect to make their fortunes in a few years' time.

On completing my first surveys on Baker Creek I crossed a low divide to Merston Creek and ran a traverse-line, connecting hay meadows up this creek to Tzenzaicut Lake. Three hay meadows were surveyed in this valley to the north of the lake and two parcels were surveyed at the east end of the lake.

The Merston Creek valley is narrow, widening out in a few places, leaving natural hay meadows in the bottom. Side-hills rise steeply from the valley to a height of 200 or 300 feet. These are thickly timbered with jack-pine growing up to 12 inches in diameter. In places a few spruce and poplar are found mingled with the jack-pine. Along the bottom of the valley a fringe of willows borders the creek on either side.

A large fire a few years back started on the west end of Tzenzaicut Lake and spread west to a distance of some 3 miles, completely cleared the country, and destroyed all the surface soil, leaving a bare and rocky country. A good trail follows Merston Creek to Tzenzaicut Lake; thence along the northern shore of the lake and continues on to Narcosli Creek, where it joins the Fraser River Wagon-road at McComb's place (Lot 9529). This trail was followed from the east end of the lake to Alexandria, and with the exception of land reserved for Indian lease, no unsurveyed agricultural land was seen.

Tzenzaicut Lake was triangulated and found to be 4 miles long, and not 9 miles as previously thought. It lies at an elevation of 3,675 feet and is much used by the Indians, who even come from as far as the Chilcotin to catch fish.

From Tzenzaicut Lake we retraced our steps down Merston Creek and found a trail leading through a low pass to Baker Creek, which we hit at the forks of Lot 9166. From here we had to cut a new trail for 3 miles up Baker Creek to join an old Indian trail from Quesnel to the Chilcotin. Along this trail I surveyed three good hay meadows on Baker Creek, and after crossing the Baker Creek-Narcosli Creek Divide, surveyed three more wild hay meadows on the headwaters of Narcosli Creek. The country along this trail is covered with second-growth jack-pine, among which, in the depressions, are a few small pot-hole meadows and a few larger ones growing good swamp-hay.

Upper Narcosli Creek Country.

While my party was surveying the meadows on the headwaters of Narcosli Creek, I explored down an old trail which follows down the North Fork of Narcosli. About 7 miles down the creek from Lot 9925 are two large swamps. These are evidently the two lakes shown on the old maps, the surfaces of which have been covered with decayed water-lily and other vegetation and has formed a muck surface. In years to come these swamps will grow grass and will eventually turn into wild hay meadows. At the present time there is no land considered worth surveying down the North Fork of this creek.

Another old trail runs from Lot 9925 over the Nazko watershed. This trail, on crossing the Nazko watershed, follows along a series of swamps and lakes, some 2 miles long, out of the end of which a creek runs in an easterly direction into Tautri Creek and thence to the Nazko.

There is considerable summer feed along this small valley, which widens out at the eastern end into a series of hay meadows; one of these, containing about 100 acres of open meadow and lying about 3 miles south-east of Lot 352, has been cut during the past years by the Chilcotin Indians, who have done some fencing and have built a wagon-road into the meadow.

In this vicinity I saw about five parcels with a total of about 400 acres of swamp-hay meadow that I consider worth surveying. On the completion of my surveys on the North Fork of Narcosli Creek I traversed along another trail which took me south to the South Fork of Narcosli Creek and brought me out on the old Palmer Trail between Lots 9697 and 9696.

The country along the trail followed is undulating and rocky and some difficulty was encountered in finding sufficient feed for our horses. The country is covered with small jack-pine, and what few swamps there are amongst the timber were too soft for horses to graze upon. I surveyed two pieces on Narcosli Creek adjoining Lot 9697, around both of which I found innumerable staking-posts.

The Palmer Trail.

Through these lots runs the old Palmer Trail, which now is little used except by Indians. It is blocked in many places by windfall, which would have to be cut out before pack-horses could use it.

Whilst my party was surveying here, I followed the old Palmer Trail to the west to what is marked on the maps as Taharti Lake. From Lot 9696 the trail follows up Narcosli Creek, passing through a stony, burned-over, jack-pine-covered country for some 3 miles, when it leaves Narcosli Creek Valley on the south and, heading slightly north of west, follows above the lake, which I believe to be Taharti Lake. This lake is about 2¾ miles long and half a mile wide; steep jack-pine-covered hills rise from its banks. At the east end of the lake is an open patch of approximately 100 acres, which in places grows a good crop of swamp-grass, and with drainage the whole piece could be made to yield a good crop of hay.

A creek runs in a westerly direction through this meadow and flows into Taharti Lake. At the west end of this lake is another large open flat, much used by the Indians for their camping-grounds while fishing. About 80 acres of this piece would grow good hay. A creek runs out of the west end of Taharti Lake and, flowing through a series of long, narrow lakes, runs into Tautri Creek. On all the old maps the water is incorrectly shown flowing in the opposite direction. I saw in this neighbourhood about 300 acres of wild hay land worth surveying.

On completing my work on Narcosli Creek I ran a tie-line to connect the Narcosli Creek surveys with the surveys already made in the Fraser River Valley. In this connection I was obliged to cut about 8 miles of new trail from a point on the old Palmer Trail some 3 miles north-east of Lot 9697 to Lot 9491. This pack-trail will be of great benefit to the few settlers

who have taken up land on Upper Narcosli Creek, saving them half a day's travel from the settlements in the Fraser Valley. Along this trail no new land fit for agriculture or hay was seen.

The Upper Narcosli Creek country, lying as it does at an elevation of approximately 3,550 feet above sea-level, is of no use for agriculture, but is a very good country for hay. Some of the larger meadows have been taken up, but there are still many small meadows worth cutting.

GAME.

During the first two months of the season very little game of any sort was seen, but on arriving in the Upper Baker Creek country fresh tracks of many kinds were seen. The moose are very plentiful and give the settlers in the country fresh beef for the whole winter. On Merston Creek my pack-train was held up by two moose who refused to move off the trail, and the packers having no guns with them that day, the animals escaped scot free. Beyond Upper Baker Creek and over the Baker Creek-Narcosli Divide the moose are not so plentiful, but many deer were seen.

Of the smaller animals, grouse and rabbits were very plentiful this season. Fish in both Baker Creek and Merston Creek were not very plentiful this year, but excellent sport was had in the Nazko River, where both the settlers and the Indians could, if they wished, support themselves on fish during the whole year. The fish in the Nazko are chiefly trout, ranging up to 2 lb. At the end of July a few salmon were running up the river, but at this distance from the Coast they were much knocked about and were only eaten by the Indians.

CLIMATE.

The country operated in this season all lay at an altitude of from 2,700 to 3,500 feet, at which height summer frosts occur during the whole summer.

I have, etc.,
W. MERSTON, B.C.L.S.

ANAHIM LAKE, RANGE 3, COAST DISTRICT.

BY T. H. TAYLOR.

VANCOUVER, B.C., November 21st, 1921.

J. E. Umbach, Esq.,
Surveyor-General, Victoria, B.C.

SIR,—The work allotted to me was chiefly the subdivision of lots located in the vicinity of Anahim Lake, Range 3, Coast District, which have reverted to the Crown under the "Soldiers' Homestead Act," and the survey of Crown lands suitable for settlement in the same district.

There are two main routes into the district—one from Bella Coola via wagon-road and trail to Anahim Lake, a distance of 110 miles, and the other from Williams Lake Townsite, on the Pacific Great Eastern Railway, via the Chilcotin Wagon-road, which is now open for traffic, through to Anahim Lake. The latter route was taken. It is longer than the Bella Coola one, but has the advantage that the greater portion of it can be travelled by train and automobile and a considerable time is thereby saved.

I left Vancouver at 9 a.m. on June 17th, travelling over the Pacific Great Eastern Railway, arriving at Williams Lake Townsite about 3 o'clock in the afternoon of the following day. This townsite, established since the advent of the railway, is at the westerly end of Williams Lake, from which it derives its name. It is already a busy and thriving little town, and being on the Chilcotin Road is the outlet for that vast territory lying to the west of the Fraser River, as well as the surrounding neighbourhood.

At this point I organized my party and proceeded by auto along the Chilcotin Road to the scene of operations, passing through the settlements of Chilcotin, Hanceville, and Alexis Creek. At the old Nigard Ranch, locally known as the Chilanko Forks, and about 8 miles westerly of the Redstone Indian Reserve, I purchased part of my supplies and outfit from Robert Pyper's store. A four-horse team, wagon, and five pack-horses from Tatlayoko Lake, as arranged beforehand, met me here. The four-horse team was also used for packing when

roads were not available. From Chilanko Forks our party proceeded as far as Frank Render's ranch, a distance of some 50 miles, where we left the automobile. In passing, I may mention that I was shown some hull-less oats 6½ feet high which had been grown by a near-by rancher, Sam Caldwell, from seed obtained from the Government Experimental Farm. From here we had to proceed by wagon and pack-horses as the road beyond was not in fit shape for auto traffic. It has only been constructed from near Mr. Render's place to Anahim Lake this year, and is still rough, but can eventually be made a good road. The grades are fair and a very good bridge has been constructed over the McClinchy River, and the country through which it passes is not difficult for road-construction.

Arriving at Cariboo Flats, we left the wagon-road, branching off to the west to survey the first block of land in my work. Commencing operations at the north-west corner of Lot 575, I surveyed seven lots containing some 4,500 acres, running westerly to Charlotte Lake, or, as the Indians call it, Kapan Lake, meaning "Little Moccasin." On the southerly shore of the lake four lots containing some 2,100 acres were surveyed, the southerly boundaries being at the foot-hills about a mile away. Charlotte Lake is a beautiful sheet of water about 15 or 20 miles in length and 5 or 6 miles in width, with numerous bays, the shores of which are covered with fine sand, making excellent bathing-beaches. The scenery of the lake, combined with the boating, fishing, bathing, and hunting facilities, make it an excellent site for a summer resort, as these facilities are unsurpassed. The elevation of the lake is approximately 3,500 feet above sea-level. The country lying between Lot 575 and the lake is generally covered with jack-pine averaging about 8 inches in diameter, and the soil is mostly rocky, but there are numerous small hay meadows scattered throughout where the soil is good. The land along the south side of Charlotte Lake for approximately a mile back is level, with dry hay meadows in places and in others covered with willow-brush, jack-pine, and spruce, which will not be difficult to clear. The soil is black alluvial deposit, with a few scattered rocks. There are several creeks running through the area to the lake which could be utilized for irrigation purposes if this was found necessary. While stationed here I took the opportunity of exploring the country south of Charlotte Lake, and found it to be all open mountainous country lying at an average elevation of 4,000 feet above sea-level, covered with good grass affording fine summer grazing. Numerous small lakes abound, and I discovered two lakes at the head of the North Fork of the Klinaklini River. These lakes bear approximately north and south and are at an elevation of 2,000 feet. The northerly one is about 10 miles long by 2 miles wide and is connected to the southerly lake by a river about a quarter of a mile long. The southerly lake is approximately 5 miles long by 2 miles wide and its outlet is into the Klinaklini River. This open country referred to stretches southerly from Charlotte Lake for about 15 or 20 miles and westerly to the lakes at the head of the Klinaklini River, and can be ridden throughout on horseback.

On finishing my work in the vicinity of Charlotte Lake I moved northerly along the wagon-road and subdivided Lots 1000, 1001, 1002, and 1003, lying between Towdystan Lake and Nimpo Lake. These lots are generally grazing lands and contain some fairly good hay meadows. While in the vicinity I took the opportunity of exploring the country to the north of Nimpo Lake and east of Dean River, and found a large tract of good grazing land with several fair hay meadows, lying at an average elevation of 3,500 feet above sea-level. I would suggest that the land lying between Dean River and Lily Lake, extending northerly as far as Lot 415 and southerly to Lot 546, be surveyed at some future date. From reliable reports I learned that there is a considerable amount of good meadow land lying to the north-east of Lily Lake and towards the Itcha Mountains, but time would not permit me to explore same.

I also explored the country to the north-east of Lot 553 for a distance of about 20 miles. It is mostly covered with jack-pine, burnt timber, and windfalls, with a few scattered meadows, and is not, in my opinion, worth surveying. There are, however, three or four sections of good meadow land lying around two fair-sized lakes on the Chilcotin Trail, about 4 miles easterly of Lot 553, which should be surveyed. Along the main road to Anahim Lake there are also three sections of land lying between Lots 554 and 555 which I consider should be surveyed, as they contain fair hay meadows and good grazing land.

From Nimpo Lake vicinity I moved northerly and subdivided Lots 519 to 529, inclusive, and Lot 538, and surveyed the remaining portion of Crown land lying between this block and Lots 420, 421, 432, and 433, surveyed by me twelve years ago. This area is generally rolling,

with good grazing land, several meadows, and tracts of jack-pine which have been burnt over in places. Several creeks containing good water traverse the area. I would suggest that the tract of Crown land lying northerly of this block, some 4,500 acres, be surveyed at some future date. It is similar to that described above. Leaving this section, we ran a tie-line 3¼ miles long from Lot 404, at the south-east end of Anahim Lake, along the telegraph-line and Bella Coola Trail, and surveyed six 160-acre lots. Some of these are being applied for as pre-emptions and leases by Messrs. Schilling, Christensen, *et al.* The land lies a few miles westerly of Anahim Lake and adjoins a small lake which I named Pelican Lake. It is mostly composed of wild hay meadows, much of which is mossy but which can be burned, and some muskeg. Between the meadows are ridges covered with poplar, willow, and jack-pine. To afford better drainage to the land, Mr. Schilling has lowered the lake about a foot, and it could be easily lowered a further 2 feet at small expense, as there is a good fall through a creek running into Anahim Lake. This completed my work for the season and I returned to Vancouver on the same route that I went in on.

General.

The weather during the spring and early fall to the middle of October is delightful. The summer is very hot, with liability to night frosts and with very little rainfall. Many of the creeks dry up by the middle of August. The mosquitoes are very bad during July and August. From all accounts the winters are not very severe.

Few deer were seen. Moose-tracks were encountered and it would seem that they are multiplying, especially to the south of Charlotte Lake and to the east of Lily Lake. It is a paradise for duck and geese (which largely breed locally), with quite a number of grouse. Trout of all kinds are plentiful in Dean River, Charlotte Lake, and in the small lakes in the mountains to the south of Charlotte Lake.

Magnesite and soda have been found in the vicinity of some lakes about 15 miles from the west end of Tatla Lake and several oil claims have been staked in the district. Iron-deposits have been staked near the Render Ranch.

The area is essentially a stock-raising country. Large areas of summer range are available, but the number of cattle that can be supported is, of course, governed by the amount of hay that can be grown for winter feed.

Settlement.

A few settlers have come in to Anahim Lake this summer, being brought in by Mr. Gray under a colonizing scheme, and there is the prospect of quite a few more coming in next year through the same agency. A store has been established by A. C. Christensen & Son on Lot 411, about 8 miles south-east of Anahim Lake, as a branch of their Bella Coola store. A few supplies were purchased here. Mr. Christensen has quite a number of head of cattle and was busily engaged in cutting hay while I was in the vicinity. The mail is delivered as far as the post-office at Tatla Lake, about 60 miles distant from Christensen's, the delivery being made once a month on the third Sunday in the month. Occasionally mail is brought in from Bella Coola.

I have, etc.,
T. H. Taylor, B.C.L.S.

HEADWATERS OF BONAPARTE RIVER, LILLOOET DISTRICT.

BY R. C. FARROW.

VANCOUVER, B.C., November 11th, 1921.

J. E. Umbach, Esq.,
Surveyor-General, Victoria, B.C.

SIR,—I have the honour to submit the following report on the work done by me near the headwaters of the Bonaparte River, East Lillooet District:—

This area lies roughly between the Cariboo Road in the vicinity of the 70-Mile House to the west and the Kamloops-Lillooet District boundary to the east. Extending eastwards from west of the Cariboo Road there is a plateau with an elevation varying from 3,800 to 4,000 feet. It is uniformly timbered with jack-pine and the soil is a light glacial drift. The only lands of any value in this area are occasional wild hay meadows, resulting from old beaver-workings. These meadows vary in area from a few acres to 100 and more. This plateau is cut by the Bonaparte River, which splits into two forks about 6 miles west of Young Lake. These streams cut through the plateau in deep valleys. A certain amount of good land lies along the valley-bottoms.

The plateau extends for about 25 to 30 miles east of the Cariboo Road, when the land begins to drop to the east and north-east to an area dotted with numerous lakes of all sizes, of which the larger and better known are Bridge Lake and Bear Lake. The watershed of this area is peculiar. Bridge Lake and numerous small ones near it drain out through Bridge Creek to the Thompson River, while other lakes, in some cases very close to Bridge Lake and its feeders, drain out to the North and South Bonaparte Rivers. There are few creeks of any size and the drainage of many of the lakes one to another is hardly discernible.

This lake area is about 3,500 feet elevation and considerable areas of good land—poplar and willow bottom—are scattered about. The soil is mostly a loam with a clay subsoil.

Farther east again a range of mountains with summits to 5,200 feet cuts off the area from the North Thompson River.

ROADS.

The district is well supplied with roads of a sort, though the majority of them are passable only for wagons, and a number, I believe, have never been taken over by the Works Department. The main road for this district leaves the Cariboo Road at the 70-Mile House and runs east and a little north to Bridge Lake. It is passable for cars but could not be classed as a good road. From this road various feeders run out to the north and south, tapping the ranches and settlements.

RANCHING.

The ranchers in the district are all small cattlemen, the plateau being unsuitable for anything else owing to the elevation. The Bridge Lake area holds out other possibilities, which I will deal with later on.

GAME.

There is a fair amount of game in the district. Willow-grouse, spruce-hen, and some blue grouse and prairie-chicken. Ducks and geese are plentiful in the fall. Deer are fairly plentiful in places, particularly along the South Bonaparte River, and there are a few bear and moose.

As far as fur-bearing animals are concerned, it appears to be a fairly good trapping country. Beaver, musk-rat, otter, marten, mink, weasel, and coyote are plentiful.

There are trout in the Bonaparte River and most of the larger lakes, several varieties and salmon-trout being in evidence. There are three notable "runs" of fish in the district each year—a run of a small specie of salmon-trout known by the Indians as Kokenees, which occurs in August and September in the South Bonaparte River above Young Lake; a run of a larger specie of salmon-trout in Bridge Lake in October; and a run of a white variety of fish in Bear Lake during the winter. I was unable to find out definitely what these were.

CLIMATE.

The winters are fairly severe, though they apparently vary considerably. The thermometer has registered 60° below zero in the district, but that is extreme and rare. The snowfall is not excessive, varying from 6 inches to 2 feet.

The plateau area is fairly dry in the summer, but farther east in the lake area there is a good rainfall, which in normal years renders irrigation unnecessary. The heat is not excessive.

WORK PERFORMED.

The total acreage surveyed by me this season was 9,150 acres. This was scattered over a considerable area.

I worked eastward from the 70-Mile House across the plateau and down to Bridge Lake; thence south to Montana and Bear Lakes; thence west again to the 70-Mile House. On the plateau I subdivided Lots 1625 to 1628 and surveyed five Government lots and two leases, Nos. 4964 to 4968 and 4970 and 5212. All these lots are very similar, consisting of a wild hay meadow surrounded by jack-pine. The ranchers on the plateau depend entirely on these meadows for their hay, which is good cattle-feed. They figure on 2 tons per head for wintering stock. I saw no vegetables or grain grown on the high lands, and old-timers claim that such crops are failures owing to the altitude and summer frosts.

I then moved to the South Bonaparte, in the vicinity of Sharpe Lake, and subdivided Lot 1807. This is good range, but hardly suitable for cultivation. Returning through here on my way out I surveyed a Government lot, No. 5213, 3 miles south-east of Sharpe Lake, containing a large meadow.

Moving on to the Bridge Lake area the country undergoes a marked change; some fir and a heavy growth of poplar and willow takes the place of the jack-pine. The growth of herbage is heavy, consisting of fireweed, peavine, vetch, lupine, and grasses. In this area I subdivided Lot 1895, situated on the south side of Bridge Lake, also a school-site about half a mile farther east, Lot 4971. While on the north side of Bridge Lake I surveyed a Government lot, No. 4977, and on my way out later in the season surveyed an island at the west end of the lake as Lot 5211.

South of Crooked Lake, which lies parallel to Bridge Lake, about half a mile to the south and draining into it, I surveyed eight Government lots, Nos. 4969, 4972 to 4980. All these lots in the vicinity of Bridge Lake contain considerable areas of poplar and willow lands on a good loam soil and should yield crops when cleared. Timothy, clover, and oats are grown in this area without irrigation. This was a very dry year and I should imagine that in normal years the crop would be good. Potatoes and other vegetables are grown with success. Summer frosts are somewhat of a menace, but do not appear to be severe enough to do much harm. At one ranch I saw growing potatoes, carrots, beets, turnips, mangels, parsnips, peas, beans, onions, radishes, lettuce, and rhubarb. Late seeding, however, is necessary for such things as peas and beans.

I next moved south and surveyed eighteen Government lots in the vicinity of Montana Lake—Lots Nos. 5191 to 5208. These again are mostly poplar and willow lands, sloping towards Montana Lake. Lots 5192 and 5195, however, contain wild hay meadows.

Moving farther south to Bear Lake, I surveyed three Government lots—No. 5210, Lillooet District, and Nos. 2112 and 2113, Kamloops District. These are willow and poplar bottoms, lying between the lake and the mountains behind. The soil is good and irrigation unnecessary.

The natural outlet for the Bridge and Bear Lake area appears to be eastwards to the Canadian National Railway along the Thompson River. There are several good passes, and a pack-trail exists now and is much used from Lac des Roches to Mount Olie Station, on the Canadian National Railway, a distance of about 20 miles. I was informed that a good road-grade could be obtained. Given better roads and therefore easier transportation—preferably a good road to the Canadian National Railway—the Bridge-Montana-Bear Lake District should develop into a dairying country.

Summer feed is plentiful and excellent, but for winter feed clearing would be necessary, which limits the size of the rancher's herd. Green feed could be successfully grown, I believe, and put up in silos.

Returning eastward, I completed my season's work by surveying four Government lots about 6 miles south-east of the 70-Mile House, all containing wild hay meadows.

I have, etc.,

R. C. FARROW, B.C.L.S.

SOUTHERN LILLOOET DISTRICT.

By G. M. Downton.

Lillooet, B.C., November 4th, 1921.

J. E. Umbach, Esq.,
Surveyor-General, Victoria, B.C.

Sir,—I have the honour to submit the following report on work done by me in the Southern Lillooet District this season:—

The work consisted of the survey of a small number of pre-emptions held by returned soldiers and other persons which were staked prior to the amendment of the "Land Act" prohibiting the staking of unsurveyed land, and which still remained unsurveyed. Also a number of ties were made connecting up surveys for mapping purposes, and a few pieces of Crown land suitable for settlement surveyed for local residents who were anxious to increase their holdings.

This work was necessarily of a very scattered nature and entailed considerable travelling. The different localities in which my work lay were as follows: The valley of the Fraser River in the vicinity of the town of Lillooet, Big Bar, Seton Lake, Anderson Lake, Pemberton Portage, Lillooet Lake, and Pemberton Meadows.

Along the valley of the Fraser River seven pre-emptions and two Government lots were surveyed, also one group of lots was resurveyed and one tie was made for mapping purposes. Big Bar, one pre-emption and eleven Government lots; Seton Lake, one pre-emption; Anderson Lake, one Government lot; Pemberton Portage, one Government lot; Lillooet Lake, two pre-emptions and several ties; Pemberton Meadows, one pre-emption. The total acreage surveyed during the season was 3,359 acres, and the average mileage per day, neglecting travelling-time, was 1 mile.

Practically all the areas mentioned above have considerable differences in climate owing to their situation and altitude. The first three—viz., valley of the Fraser River, Big Bar, and Seton Lake—are in what is known as the "Dry Belt." The last two—viz., Lillooet Lake and Pemberton Meadows—experience a climate rather similar to that met with on the Coast; while Anderson Lake and Pemberton Portage may be classed as intermediate, being located in the midst of the Cascade Range.

Describing the general characteristics of the areas in the order mentioned:—

Fraser Valley Benches.

The Fraser River Valley from the town of Lytton (47 miles south-south-east of the town of Lillooet) to at least 80 miles north of Lillooet may be described as running, generally speaking, due north and south. The mountains on each side of the valley are not very rugged except at isolated points, and are uniformly clothed to their summits with a stunted growth of Douglas fir. There is also a considerable growth of yellow pine in the southern part of this area, this being replaced by black pine farther north. The average width of the valley proper is not more than 2 miles from mountain-foot to mountain-foot on each side, and it is much narrower in some places. In prehistoric times vast quantities of silt and gravel have been deposited by glacial action in this valley, and possibly at the close of the glacial period the aspect of the valley was similar to many others in the Province; that is to say, fairly flat, with a river meandering from side to side, and possibly with periodic floods. In the course of subsequent ages, however, the river has cut down through the gravel and silt, swinging from side to side of the valley as it found a softer material, until at the present time it seems to have reached bed-rock, 500 or 600 feet below the glacial deposits, leaving in successive ages flat water-worn benches at various heights and of varying widths and shapes. In places perfectly flat, more generally tilted at a slight slope towards the river, and in most cases bare of trees, these benches form a distinctive feature of the landscape, and wherever water has been obtainable from neighbouring mountain streams they have proved most extraordinarily productive.

The subsoil composing these benches is boulder-clay and gravel; the top soil is mostly a very fine pulverized river-silt with varying percentages of sand and clay. Light sandy loam best describes the general soil, which is of a light texture, and although locally there are considerable outcroppings of gumbo, the soil is porous and does not readily retain a large amount

of moisture. The average elevation of these benches above sea-level varies from about 500 feet (the lowest level at Lytton) to about 1,600 feet, the highest in the vicinity of Canoe Creek. The average annual rainfall does not exceed 15 inches, practically all of which falls between September 30th and April 15th.

Over this area then, rightly described as a region of almost perpetual sunshine, cultivation can only be carried on by means of irrigation, and up to the present time only those benches on to which water can be easily got by gravity from creeks flowing from the adjacent mountains can be cultivated. The remainder lie idle and unproductive, covered by a growth of sage-brush. There is a wide field in this locality for the irrigation engineer, but lack of transportation and markets have hitherto checked development. Shortage of water is undoubtedly acute, but there are great storage possibilities on many of the streams. Added to this there is a great reluctance on the part of property-owners to subdivide and sell for reasonable prices the areas now under cultivation, and there has been in the past a most regrettable practice of renting them *en bloc* for a period of years to Chinamen, whose unfailing practice seems to be to work them until the soil is thoroughly impoverished and then turn them back to their owners. The possibilities of this area have been amply demonstrated. Lillooet potatoes command the highest price in the Coast markets to-day and cannot be beaten. Three crops of alfalfa can be raised and harvested in the year. The apple-orchards of Lillooet are equal to any sections of the Okanagan, and only lack of organization on the part of the fruit-growers has hitherto prevented the quality of the fruit from being appreciated. With the completion of the Pacific Great Eastern Railway to Fort George and the connection with the Prairie via the Grand Trunk Pacific thus assured, the present very restricted market will change to conditions where the demand will greatly exceed the supply, and the area described is practically the last point north at which fruit can be successfully raised.

The state of development at which this area has now arrived is that at which practically no Crown land suitable for settlement remains. No subdivision of original Crown grants has yet taken place and there is apparently no move at present in this direction. The area will undoubtedly support a large population, and I believe eventually that fruit will become the staple product. The climate is almost unrivalled in this Province, the winters being comparatively mild and the summers hot and dry. The lowest temperature last winter in Lillooet was 10° above zero; this was exceptionally mild, but the lowest temperatures experienced usually are about 15° below zero. The highest summer temperature is about 98° to 100° in the shade and lasts about two weeks at the end of July.

The Pacific Great Eastern Railway serves this area, with stations at Lillooet, Mackinnon, Glenfraser, and Pavilion. There is much need of a wagon-road on the west side of the Fraser River, opposite Glenfraser and Pavilion, connecting with the east side, with a bridge somewhere in the neighbourhood of Pavilion. An inadequate ferry at Pavilion now serves a large area on the west side, and the only direct connection with Lillooet is by a mountainous pack-trail, dangerous in winter and most laborious in summer.

The town of Lillooet, reached either by the Pacific Great Eastern Railway from Squamish or by 47 miles of auto-road from Lytton, on the Canadian Pacific Railway, is a small town of about 200 inhabitants, pleasantly situated near the point where the outflow of Seton Lake and Cayoosh Creek enter the Fraser River from the west at an elevation of 840 feet above sea-level. There are three churches, two hotels, hospital, school, telegraph-office, and several well-equipped general stores, and railway-station on the Pacific Great Eastern Railway.

Big Bar.

Finishing up my operations on the Fraser River, I proceeded to the vicinity of Big Bar Creek, which flows into the Fraser River from the east 40 miles above the town of Lillooet. This creek rises in Big Bar Lake, situated on the high green timber plateau at the northern end of the Marble Mountains, at about 3,700 feet above sea-level, and is supplemented by several creeks which have their source on the western slopes of the Marble Mountains. The largest of these creeks is 7-Mile or Stable Creek, and at the point where this creek emerges from the foothills of the Marble Mountains is a considerable plateau at an elevation of about 4,000 feet above sea-level. The elevation here renders this area unsuitable for anything but cattle-raising and dairying, and only a limited area can be brought under cultivation for raising hay for winter feeding owing to the lack of water and the depth of the creeks below the general level of the

plateau. The plateau is covered with a uniform growth of jack-pine, a good deal of which has been burnt off, leaving patches where the small pines are coming up very strongly. In places where there had been recent burns I noticed quite a strong growth of wild grasses. Any area that can be irrigated will grow good crops of timothy and clover. I surveyed three new lots along 7-Mile Creek and two along 11-Mile Creek, on to all of which water could easily be brought, and there still remains a little land on 11-Mile Creek which might be surveyed to advantage when it has been demonstrated what can be done on the land surveyed this year. I did not feel justified in surveying any more here, as the season was getting short and my programme did not admit of any delay.

Seton Lake.

Seton Lake, about 13 miles long and three-quarters of a mile wide, lies just to the west of the town of Lillooet, at an elevation of 777 feet above sea-level. There is a very limited amount of agricultural land along the lake, and practically all the land that can be brought under cultivation lies either on Indian reserve or has already been alienated from the Crown. The climate is very mild in winter and hot in summer, and except from the point of view of scenery and location for summer homes, it may be almost discounted from an agricultural point of view. The Pacific Great Eastern Railway runs along the north shore, and at a point near Shalalth Station on the north shore the Bridge River Power Company, of Vancouver, is investigating with a view to developing water-power by tunnelling through the mountain between Bridge River and Seton Lake, a distance of 2 miles, and turning the water of Bridge River through the mountain to Seton Lake. The difference of elevation between Bridge River and the lake is about 1,200 feet and would necessitate a penstock about half a mile long down the mountain-side. The maximum horse-power that could eventually be developed here is estimated to be over 400,000.

At Shalalth Station the Government road to Bridge River starts up Mission Mountain and reaches the top by a series of switchbacks in a distance of 5 miles. This is the shortest route to the valley of the Whitewater, where a remarkable gold strike was made this spring. This route follows the Bridge River Road for 33 miles and then branches off up the Gun Creek Trail, which rises steadily for about 35 miles after leaving the road and passes over a summit about 6,500 feet above sea-level before descending into the Whitewater Valley. This route, however, is not open on account of snow until about June 1st. The other route is via Big Creek, where a wagon-road connecting with the Fraser River Bridge at Churn Creek reaches to a point to within 25 miles of the workings, and from which point an easy trail passable in April has been built.

Anderson Lake.

Anderson Lake, also about 13 miles long and three-quarters of a mile wide, lies to the south-west of Seton Lake and is separated therefrom by a portage 1½ miles long. This lake is about 60 feet higher than Seton Lake and discharges into it by a creek which flows across the portage. The Pacific Great Eastern Railway follows along the west shore of the lake, which is uniformly mountainous and rugged. Small points here and there jutting out into the lake might form a vantage-ground for some summer cottage or tourist resort, but there is practically no agricultural land of any value from one end to the other of the lake.

The portage between the two lakes has a limited amount of agricultural land on it and it has an ideal climate for fruit-raising.

At the south end of Anderson Lake, at D'Arcy Station, on the Pacific Great Eastern Railway, there is a pleasant summer hotel. The scenery along these lakes is magnificent and it is probable that this locality will become a popular tourist resort. My operations here this year were confined to the survey of a small point of land about 4 miles up Anderson Lake on the east side.

Pemberton Portage.

The Pacific Great Eastern Railway on leaving the south end of Anderson Lake climbs from an elevation of 850 to 1,625 feet in about 11 miles, and at this elevation about a mile south of Summit Lake crosses the divide. Summit Lake is a small sheet of water about a mile long and half a mile wide and is situated at the point where the portage passes through the summits of the Cascade range of mountains. The whole valley of the Pemberton Portage is not more than a mile wide from side to side, and in some places narrower. There is a limited amount

of agricultural land north of Summit Lake, but practically none south of it, as most of the land south of this is heavily timbered; in fact, it may be said that the Dry Belt ends at Summit Lake and the Wet Belt commences. Pemberton Portage is one of two main passes through the Cascade Range in British Columbia, the other being the point just below the town of Hope, where the Fraser River cuts through the range.

There has been considerable activity in agriculture along the northern part of the Pemberton Portage within the last three years, and in several places new settlers are clearing the bottom land and bringing it under cultivation. Noticeably is this the case with a Mr. Jonkis, a French-Canadian, who has recently settled here, and whose large family of sons has satisfactorily solved the problem of the hired man. I only made one survey in this area just south of Summit Lake.

LILLOOET LAKE.

As above stated, the railway crosses the divide about a mile south of Summit Lake and descends along the Birkenhead River to the valley of the Upper Lillooet River, which it enters 6 miles above the upper (north-western) end of Lillooet Lake.

This lake is about 16½ miles long and has an average width of three-quarters of a mile. It is practically devoid of any agricultural land on either side throughout its whole length, and with very few exceptions the mountains rise fairly steeply from the lake. These mountain-sides for about half a mile back from the lake are heavily timbered with Douglas fir interspersed with a small amount of hemlock and red cedar. The bulk of this timber is held under timber licence, but there are small patches here and there lying outside these limits.

The Upper Lillooet River flows into the lake at the north-western end, and there is no doubt that in earlier times the lake was much longer than it is at present. Evidence points to the fact that all the area from a point about 2 miles above the point where the railway crosses the Upper Lillooet River to the present north-west end of the lake, 9 miles below the railway crossing, was part of the lake within comparatively recent times, but the enormous quantities of silt which are brought down by the Lillooet River have gradually filled up the lake, and each succeeding year at flood-time more silt is laid over the whole area, until at the present time it is only flooded at highest water. The fall in the Lillooet River through this area is so slight and the material of which the soil is composed so light that new channels may be formed in a single flood, with the result that the point where the Lillooet River now enters the lake is a network of channels, some of which are dry except at high water. The slow process of accretion is still proceeding and pushing sand-bars farther and farther into the lake. As these become higher each year above the water from the deposit of silt at flood-time, willow-seeds blown from the vegetation farther up or deposited with the silt, germinate and cover the sand-bars, bind the soil together, and assist the work of natural reclamation. I gave an estimate in 1913 that the rate of accretion was proceeding at the rate of 1 mile in 100 years, but I am now inclined to believe that it is proceeding considerably faster than this.

The outlet at the lower or southern end of the lake is not large enough in cross-section to carry off the flood-water in summer, with the result that the level of the lake rises rapidly and backs the water up the lower stretches of the Lillooet River.

Three-quarters of a mile below the southern end of Lillooet Lake is another lake known as Little Lillooet or Tenas Lake; it is 5 miles long and not more than a quarter of a mile wide in the widest part, narrowing in the middle to about 100 yards. The level of this lake is about 15 feet lower than that of Lillooet Lake, and the waters of the latter shoot down into the lower lake with considerable velocity.

In 1860 a wagon-road was built by the Royal Engineers from Douglas, on Harrison Lake, to the lower end of Little Lillooet Lake to accommodate the traffic to the Cariboo, and a little later a steamboat was built on Lillooet Lake for the same traffic. A dam was built across the outlet at the lower end of Little Lillooet Lake to raise the water sufficiently to enable this steamboat to more easily negotiate the rapids between the two lakes, and it is said by Indians, with what truth I cannot say, that the building of the dam was coincident with the commencement of bad floods in the low land at the upper end of Lillooet Lake. The fact remains that there is an extensive gravel-bar now existing just above the site of the dam, the position of which can still be discerned by the broken piles and old crib-work just at the outlet of the lake, although the dam has long since rotted away and been washed down by floods. It is in the removal of this gravel-bar, as well as in the widening and deepening of the rapids between the two lakes, that the solution of the problem of relieving the floods may be found.

Lillooet Valley.

In my report on the Pemberton section, published in the Annual Report of the Minister of Lands for the year ending December 31st, 1919, I reviewed at some length the question of reclamation by lowering the lake-level and straightening the Upper Lillooet River. A repetition of my remarks is hardly necessary here, except to emphasize the financial advantages of a well-considered policy of drainage and protection to the property-owners in the valley of the Upper Lillooet River. A very large area in this valley is owned by corporations who are at present deriving no income from their land, the taxes on which are a constant drain. Considerable tracts are swampy and there is the constant danger of summer flooding and consequent damage to crops, as well as the ever-present sense of insecurity should this land be cleared and put under cultivation. Projects have been started, proposing that in return for the land being drained the company reclaiming the land should become entitled to some percentage of the area thus reclaimed and protected. It appears reasonable that a project which converts land of no value into land of considerable agricultural value should attract the notice and consideration of the property-owners, but only those owners who are in residence can appreciate the situation, and the larger number of absentee owners either cannot be easily approached or appear indifferent, and the projects have been abandoned.

This valley is the natural home of the black currant and raspberry and can support a very large population, and it might easily become one of the most thriving agricultural communities in the Province. The climate is such that silos are the solution of the winter feeding of dairy cattle and stock. The growing season is long and the winters are mild, the snow falling and lying before the frost has a chance to freeze the ground. There is an area of approximately 40,000 acres of cultivable land in the valley.

This valley can at present be reached by the Pacific Great Eastern Railway, leaving Vancouver at 9 a.m. and arriving at Pemberton Station about 5 p.m.

Yalakom River.

On the completion of my work in this area I made a hurried trip to Yalakom River, formerly known as the North Fork of Bridge River. Considerable work has been done on five of the ranches since my last visit in 1913, and a school is now being built. The Yalakom River joins the Bridge River 15 miles above the point where the Bridge River flows into the Fraser River, and the available agricultural land along it is situated on fairly level benches about 300 feet above the river-level.

The benches on the north-east of the valley are covered with a stunted growth of yellow pine easily cleared, while Douglas fir predominates on the south-western side of the valley. The climate is such that apples can be grown, and alfalfa does well; there is also good summer range on the adjacent mountains. There is a good water-supply for irrigation on the south-western side, but the north-western side is badly in need of an irrigation system. About 600 acres of bench land could be brought under cultivation on this side by means of a ditch, and water could be obtained either by an inverted siphon across the valley from La Rochelle Creek, or by going 5 or 6 miles farther up the river and taking water out of the river itself. Both these schemes will entail considerable labour, and at present the three ranches mostly concerned cannot command the required capital. When water is got on to these benches they will be very valuable.

There does not appear to be any land suitable for settlement farther up the river beyond 4-Mile Creek, and with the completion of Lot 5150, which I surveyed here this year, I consider that all the surveying in this locality is finished so far as vacant Crown land is concerned.

I have, etc.,

G. M. Downton, B.C.L.S.

BIG SHEEP CREEK AND SLOCAN LAKE, KOOTENAY DISTRICT.

By W. J. H. Holmes.

Victoria, B.C., December 7th, 1921.

J. E. Umbach, Esq.,
Surveyor-General, Victoria, B.C.

Sir,—My work this year was located at or near the headwaters of Big Sheep Creek, about 14 miles due north-west of Rossland as the crow flies, and in the valley of Slocan Lake, Kootenay District, and consisted of the survey of vacant Crown lands suitable for settlement, also the survey of two small blocks of land in the valley of Goose Creek, near Crescent Valley, Slocan River.

I organized a survey party in Nelson on May 20th and first proceeded to Beasley, on the Kootenay River, to make a connection between Lot 12804 and a mineral claim, Lot 2082; then on May 24th I took my party to Crescent Valley and pitched camp about 3 miles up Goose Creek. This valley, while maintaining as settlers a few others, is largely occupied by Doukhobors, who have cleared up and placed under cultivation some 500 or 600 acres. These people appear to be very successful and are growing large crops of potatoes, wheat, and oats, besides garden-truck of all kinds and small fruits, also flax, which they themselves weave and manufacture into cloth. They have this year completed the installation of a large pump on Goose Creek for irrigation purposes.

The soil in the valley is a light sandy loam and wherever water can be got on the land is highly productive. The lack of water is without doubt the cause of many hundreds of acres of excellent land that are owned by our own people now lying idle and unproductive. Many blocks have been cleared, or partly so, and are now apparently abandoned.

The village of Crescent Valley, near the mouth of Goose Creek, is on the Slocan River and on the line of the Slocan Branch of the Canadian Pacific Railway, and has a general store, post-office, church, school, etc. It is on the main highway between Rossland, Trail, and Nelson, which road crosses the Columbia River by ferry at Castlegar; thence follows up Pass Creek for about 6 miles, and swinging to the east follows down Goose Creek and crosses the Slocan River at Crescent Valley; thence along the north side of the Kootenay River, past Bonnington Falls to Nelson.

On June 4th I left Crescent Valley with a view to commencing operations in the valley of Big Sheep Creek, and the same evening arrived at Paulson, on the line of the Kettle River branch of the Canadian Pacific Railway, and the next day proceeded to get the party and outfit out to Michener's ranch, which is at the end of an old logging-road, a distance of about 5½ miles by rough road from Paulson. At Paulson there is only an hotel, with general store and post-office on the ground floor. There is a fairly good wagon-road between Cascade and Paulson, and this road continues up Hamlin Creek to the Inland Empire Mine, now lying idle.

I camped at Michener's ranch for ten days and constructed a good horse-trail from there eastward for a distance of 2½ miles, giving access to the valley of Big Sheep Creek and connecting with the old Government trail running through this valley to Rossland.

Headwaters of Big Sheep Creek.

This is an attractive valley varying in width to over half a mile and almost level for over 5 miles. There are numerous grass meadows throughout this part of the valley, between which are stretches of open pine and spruce 6 to 10 inches in size. The mountains on either side slope more or less gently away, and, while many fires have run over the hills, are in places still covered with pine and spruce up to 12 inches in diameter and some cedar. Before the fires the timber was in places as large as 3 and 4 feet in diameter on the hillsides. In the centre of the stretch under review lies what I have named Meadow Lake; this is a pond of about 4 acres lying in the centre of an open grass meadow of about 100 acres and empties westward into Big Sheep Creek.

At the eastern end of the stretch I surveyed lies Sheep Lake, a body of water of about 80 acres, which is the source of Blueberry Creek, flowing eastward and emptying into the Columbia River about 3 miles south of Castlegar. The lake is supplied by a small stream flowing through the meadows and flat lands on the west.

When I arrived in the valley in June it was particularly beautiful with its profusion of wild flowers and other spring vegetation. I found the valley literally covered with blue violets, while not only the flat lands, but also the hillsides were covered thickly with wild strawberry blossoms, and the fruit a little later provided us with a welcome addition to our bacon and beans.

The altitude of Sheep Lake is 4,120 feet and of Meadow Lake 4,250 feet, and owing to the possibility of summer frosts the land is probably best suitable for stock. Snow arrives towards the end of October, but I am informed it is often a month later, and the ground is bare again in the spring towards the end of April or early in May.

The soil on the hillsides is a light sandy loam on a gravel subsoil. The flat lands are a variety of alluvial soils, varying from light sandy loam or gravel to deep light loam rich in humus, while in the meadows the soil is distinctly peaty, with a depth varying up to 4 feet, and perhaps more.

Game is plentiful in the valley; that is to say, deer are numerous and there are some caribou. Black bear are numerous also, and grizzly and silver-tip are to be found farther back from the valley on the higher mountains. Grouse are plentiful and also rabbits, and there are some mink and marten. I saw many old beaver signs, but none fresh.

I here surveyed a total of 2,700 acres. Any one desiring to look at these lands should go in from Paulson, and may arrange ahead with H. D. Griswold, the postmaster, for riding-horses to be brought from Cascade. A hurried trip in and out might be made in one day, but for a careful examination one or more pack-horses should be taken with camp outfit. Arrangements with Mr. Griswold could be made for a guide.

Early in August I withdrew my party from Big Sheep Creek and proceeded to Rosebery, on Slocan Lake, for the purpose of surveying some lands on Wilson Creek which had been reported as being suitable for settlement, and on August 15th completed the establishment of camp about 9 miles up this creek from Slocan Creek.

Wilson Creek.

As described in my report of 1920, this is the largest stream flowing into Slocan Lake, and is about 100 feet wide and 8 feet deep at the mouth, with a current 8 to 10 miles per hour when in flood, and which at the time of low water falls to 1 to 2 feet deep. The creek takes its rise in several tributaries in the range of mountains along the southern border of the watershed of Lardeau Lake and River, and flows almost south, entering Slocan Lake, near its north end at the town of Rosebery, or about 3½ miles north of the town of New Denver. It is a typical mountain stream, the mountains for the most part sloping steeply down to the water's edge; for the first 8 or 10 miles or so from the mouth there is little or no width to the valley-bottom. The valley at one time was heavily timbered with cedar and fir ranging up to 4 feet in diameter, and even more, interspersed with hemlock. As you ascend the mountain-sides the timber is lighter, and you also find tamarack, spruce, and pine to 2 feet in diameter. Periodical fires have destroyed much of this valuable timber, but much still remains.

About 8 miles up the creek, on a bench on the west side, is some of the best land I have seen in the district. This bench is about 2 miles long and three-quarters of a mile wide in its widest part. It is almost all covered by pre-emptions, but I surveyed two blocks at the north end which are available for settlement.

On this bench the soil is alluvial and varies from 6 to 18 inches of light sandy loam to the same of clay loam; the subsoil is in places gravel and in other places a blue clay.

After completing my work on Wilson Creek I moved my party to the south end of Slocan Lake and ran a tie traverse between the existing surveys about Slocan City and other surveyed lots situated on the east side of the lake, and at the same time, by triangulation, connected up certain isolated surveys on the west side of the lake. I also surveyed three pieces of unoccupied Crown land situated on the east side of the lake.

I have, etc.,

W. J. H. Holmes, B.C.L.S.

CASTLEGAR TOWNSITE AND MISCELLANEOUS SURVEYS, KOOTENAY DISTRICT.

By S. S. McDiarmid.

Robson, B.C., October 13th, 1921.

J. E. Umbach, Esq.,
Surveyor-General, Victoria, B.C.

Sir,—Under your instructions, a number of small surveys have been made by me in the vicinity of Castlegar, in the Kootenay District. This district is so well known and so well served by transportation systems that there is little to be supplied as information by a surveyor. Much is hoped for in the establishment of industries and railway development at Castlegar. For some time the construction of a pulp and paper mill has been mooted, and it may be that with more settled conditions in the financial and commercial markets this will be realized, making Castlegar something more than a railway junction as it is to-day. The Arrow Lakes and Upper Columbia River could be used for driving and towing pulp-wood, and this great territory would feed a mill sited at Castlegar, where the manufactured product would be shipped by rail.

There has been more or less talk of Castlegar becoming a Canadian Pacific Railway divisional point, with repair-shops and other necessary works. Should this materialize or should a pulp industry be established, the subdivision which was made this summer for your Department will be rapidly taken up. The sole industry at present is the mill of the Edgewood Lumber Co., situated on the north side of the Columbia River, over which a foot-bridge is built against the railway-bridge. All vehicular traffic must use the Government-operated ferry, which is a gas-engined and cable ferry running about half a mile west of the railway-bridge. The ferry is of great importance to road traffic between Rossland and Nelson, and in the summer is used a great deal by automobile tourists, for it forms a link in the Trans-Provincial Highway.

The Arrow Lakes are dependent upon the Canadian Pacific Railway steamer service, which has of late been only tri-weekly in each direction. The lower terminus of the steamer run is West Robson, a mile west of Castlegar. At this point passengers and goods are transferred to the Kettle Valley Railway. The shores of Lower Arrow Lake are quite steep and wooded. The timber is small and is chiefly composed of fir, cedar, pine, and tamarack, some of which is desirable for lumber. Wherever a tributary stream forms a valley, or wherever the ground is of easy slope, orchards have been planted by settlers. The fruit is of excellent quality, and it is claimed that this is the finest district for growing Bing and Lambert cherries.

The climate is not severe in winter, as excellent peach-orchards at Renata and Deer Park prove. In summer there are periods of hot stretches with a notable absence of rainfall. This latter condition makes irrigation a necessity and much may be done towards increasing production by getting water on the land. The snowfall is light and streams soon go dry in the summer, except in the case of those which rise far back in the higher mountains.

Owing to the sparse settlement and the prevailing natural conditions the shores of the lakes are an excellent refuge for game. It is not a district to attract the professional sportsman, but for the man who looks for a few days' hunting in the autumn it will furnish good sport for grouse, deer, and black bear. The coyote is somewhat of a pest to the rancher, but is not easily caught.

The mining industry seems to have suffered through adverse conditions. Practically all the ore for the Trail Smelter is drawn from other places.

I have, etc.,
S. S. McDiarmid, B.C.L.S.

SIMILKAMEEN DIVISION OF YALE DISTRICT.

By A. H. Holland.

Vancouver, B.C., December 5th, 1921.

J. E. Umbach, Esq.,
Surveyor-General, Victoria, B.C.

Sir,—I beg to submit the following report in connection with surveys made by me during the past season, which consist chiefly of the surveys of land in the Heinze Belt, previously held under reserve but now thrown open for pre-emption, and open Crown lands in Christian Valley:—

Following your instructions of June 11th, a party was organized and we proceeded to Grand Forks, where I made my headquarters for the season.

Sutherland Creek.

On June 18th we left Grand Forks by motor-truck for the headwaters of Sutherland Creek, a distance of 12 miles. Passing through Cascade, we noticed the new road from Cascade to Rossland was under construction, which when completed will be the Inter-Provincial Highway. We then climbed the steep wagon-road to Fife, where the railway siding was piled high with poles and ties, showing the work done by the ranchers and tie camps up Sutherland Creek during the past winter, and proceeding up the road noticed the prosperous-looking ranches and many acres of logged-off land that are now being stumped and ploughed.

During the season of 1920 a severe forest fire swept through this valley, having originated on Italy Creek, a tributary of Sutherland Creek, and though all the merchantable timber was fire-killed, it left the logged-off land in better shape for settlement, and it was in this area that we surveyed two small lots.

Deer Creek.

Our next move was to the headwaters of Deer Creek, which rises on the same height of land as one branch of Fourth of July Creek, but flows into the North Fork of the Kettle River, whereas Fourth of July Creek empties into the main Kettle River. We travelled by motor-truck, again passing through Grand Forks, where the packing-houses were all busy shipping cherries and small fruits.

At the headwaters of Fourth of July Creek we left the truck on the main road and proceeded by wagon over an old logging-road, which is in good condition for 2 miles, or as far as a squatter's clearing. Here we surveyed 1,800 acres of more or less heavily timbered land, where ties have been cut for several years past, leaving the balance chiefly suited for cordwood. The soil is clay loam with some rock, and though this area would be fairly heavy clearing, it has several small spring creeks through it, and there is open range both on the north and south. This land is between 2,500 and 3,200 feet in elevation, and one squatter has a small clearing where small fruits as well as grain do well.

Adjoining this land on the north and lying at the head of Fisherman Creek is what is known as "Summit Camp," where in the past considerable mining development was carried on, but which is now deserted, and the hillsides, which were at one time full of mining prospects, would serve as good summer range for a number of cattle.

Loon Lake.

From here we moved by wagon over the main highway (Grand Forks to Greenwood) to Loon Lake, passing through Denoro, where at that time the Canadian Consolidated Mining Company was operating the Emma Mine. This lake is on the summit of Eholt Mountain at an elevation of 3,200 feet and about 1½ miles from Eholt Station on the Canadian Pacific Railway. Here we surveyed two lots, one of which has been held under mineral licence for some years and has had improvements to the value of several thousand dollars made, consisting of small cabin, barns, and 25 acres seeded to timothy and clover.

The greater part of the surrounding country is held under mineral licences, and though active mining has ceased, it is still not available for settlement, though there are some small areas which no doubt will later come under cultivation.

Brown Creek.

Our next move was to the mouth of Brown Creek, and this necessitated our going over the divide and down into the valley of the North Fork of the Kettle River, but rather than go back through Grand Forks and up the main road of the North Fork we went to Eholt, and from there followed a road little used on account of its steep grades and which was originally built in construction days to supply contractors' camps.

The land surveyed lies between the Canadian Pacific Railway right-of-way and Brown Creek and is on a rolling side-hill covered with willow, poplar, and pine, which would not be heavy clearing and would raise good hay-crops, the ground being sub-irrigated from the surrounding hills and having several springs coming to the surface on the lots. There is a small clearing of about 5 acres on one of the lots and the owner cuts timothy and clover thereon, holding the land under mineral licence.

Most of this area is covered by reverted mineral claims and there are some hundreds of acres lying to the south which are suitable for cultivation, but are still tied up under mineral licences, though there has been no mining in the vicinity for a number of years. The land to the north is more broken and rocky and is now almost bare of timber, having been fire-swept many times, and would afford good pasturage for a few hundred head of cattle.

Sand Creek.

This work completed, we moved by wagon to the mouth of Sand Creek and before leaving the main valley surveyed a reverted mineral claim near Snowball Creek; then, having obtained pack-horses, moved 3 miles into the hills to the basin of Sand Creek.

About ten years ago there was a considerable area of Crown lands staked and surveyed in this locality and some thousands of dollars were spent in building a wagon-road from Grand Forks up Averil Creek and into this land; no settlers, however, remained on the surveyed lots, which have now reverted to the Crown, and the road fell into disuse and successive fires have blocked it with windfall and burnt out some small bridges, but it was laid out with a good grade and the expenditure of very little money would again make it passable for wagons as far as the surveys which were made by me this year.

At an elevation from 3,200 to 3,500 feet, 1,300 acres were surveyed here; all of it suitable for settlement. There is little or no standing timber remaining, as it has been fire-swept several times and is now grown up in willow, poplar, and small jack-pine, the clearing of which would be fairly heavy, but the soil is a sandy or clay loam, with some gravel and boulders, and there is a sufficiency of water to make it good hay land.

The most northerly of these lots is in the drainage-basin of Snowball Creek, and there are between 1,500 and 2,000 acres of good land in this basin still unsurveyed, but the growth is very thick pine and tamarack scrub which has been fire-killed, and the windfalls are now in such a tangle that we found it impossible to get a trail in without at least a week's hard work, and as there was a forest fire in the neighbourhood, I did not consider it advisable to attempt the work till the land already surveyed had been taken up.

Throughout all this land there is a growth of feed-grass and there are about 200 head of cattle ranging through it. There is only one settler and he has about 2 acres in timothy in a clearing around his cabin and only uses his place to pasture his cattle, which he drives in during the summer months.

Hardy Mountain.

Our next work was on Hardy Mountain, 3,800 feet above sea-level and 2,000 feet above the valley, lying between Fourth of July Creek and the North Fork of the Kettle River, so we moved back to the mouth of Sand Creek by pack-horses; then by wagon up a steep but good wagon-road almost to the top of Hardy Mountain. Climbing the hillside one gets a most wonderful view of Grand Forks and the valley of the main Kettle River for miles, with its orchards, gardens, and grain-fields, and one can also see the towns and ranches across the International Boundary; it also affords a view up the North Fork of the Kettle River for some miles.

The land surveyed lies in a basin at the head of Hardy Creek, where we found a small lake of about 2 acres, which is the source of the creek and is used as a reservoir for irrigation purpose in the main valley. There is a growth of fir and tamarack from 6 to 20 inches, but

there is little or no merchantable timber, though some ties could be cut and the balance would be good firewood, which has a market in Grand Forks, only 5 miles distant. The soil is silt or clay loam with some small gravel throughout, and as evidence of its fertility the adjoining lot has been cultivated for ten years and raises good grain, vegetables, and all small fruits, and we saw both tomatoes and melons ripening while there in August.

Lying to the north-west there are 300 to 400 acres of open range land, which, though steep and rocky, affords good pasturage for a number of cattle.

Boundary Creek.

Our next work was on Boundary Creek, 25 miles away, so we moved by wagon to the foot of the hill, where a motor-truck was waiting, and rather than go down into the valley over the main road we followed a wagon-road through a Doukhobor settlement, joining the main road on Fourth of July Creek near Spencer.

We drove for 3 miles through the Doukhobor farms, where one marvels at the work done by these settlers; the orchards all laden with fruit, the small fruits, the vegetable-gardens, and even the houses a picture of neatness surrounded by a mass of flowers. We stopped at one house for water, and men, women, and children gathered tomatoes, cucumbers, apples, and even presented us with a watermelon, all freshly picked.

We camped at the junction of Eholt and Boundary Creeks, the land surveyed lying north and west along this latter for 4 miles. The country is broken and is chiefly suited for pasturage, as the timber has been logged or burnt and now grown up in poplar and jack-pine. The basins on two creeks have good clay loam and no doubt will be shortly taken up, as they are both adjoining a first-class waogn-road leading to the Jewel Mine, 3 miles away.

It is reported that there is a further area of agricultural land 10 miles beyond the wagon-road, but as there is no trail it was considered to be too far to be inspected.

Lind Creek.

From here we moved up Lind Creek Road to an elevation of 4,000 feet, where two lots covering reverted mineral claims were surveyed. This ground has been logged for ties and cordwood and would be fairly heavy clearing, and though the soil is clay to a depth of from 4 to 6 feet and all sub-irrigated, it would be only suitable for hay-raising, as it lies on the north slope of the hill and the growing season is short.

The adjoining land is being used for dairy purposes, and as the feed through the timber is good they seem to be making it pay, but the area open for settlement is very limited, as practically this whole hillside, extending from Greenwood at the bottom to the old townsite of Phoenix at the top, is covered by mineral claims, which, though not working, still prevent the surface being taken up for agricultural purposes.

Nicholson Creek.

Our next move was up Nicholson Creek, which flows into the Kettle River from the north about 7 miles west of Midway. There are some good ranches along the creek on the lower levels, but the pieces surveyed are at an elevation of 3,300 to 3,700 feet, and being without running water are best suited for pasturage.

The timber in this valley, chiefly yellow pine and tamarack, is open and park-like and there is good feed-grass throughout. There is a good wagon-road extending back about 10 miles into the hills, where there are several settlers, chiefly raising cattle, and there is also a small sawmill operating.

Rock Creek.

This work completed and having a number of small pieces to do around Rock Creek and Bridesville, we moved to Rock Creek and camped near the traffic-bridge over the Kettle River. In the sixties Rock Creek was the centre of considerable excitement and the creek-bottom and the bench claims were washed for many years, the Chinese having worked until a few years ago. It is again, this season, being prospected and an attempt is being made to sink a shaft to bed-rock near its junction with the Kettle River, but the difficulty in handling the water had forced a temporary lay-off before getting to any great depth.

JOLLY JACK CREEK.

From this camp we surveyed a lot on Jolly Jack Creek, reached by the old stage-road to Camp McKinney. This piece was taken up for a wild hay meadow that is on it and for pasture on the surrounding hills. The adjoining country, being high and timbered, is not fitted for settlement at the present time.

WESTBRIDGE.

We also surveyed a small piece of bottom land about 5 miles north-west of Westbridge, on the West Fork of the Kettle River. This part of the valley is very narrow and the mountains rise steeply on either side and are covered with fir and jack-pine of no commercial value, but there is a fair range throughout.

CHRISTIAN VALLEY.

Having completed the work in this vicinity, we moved by a 2-ton motor-truck up the main Kettle River, through Westbridge into Christian Valley, a distance of 45 miles. The road is only a fair one and at times the heavy truck failed to take the soft sandy grades without help from the party, and it was almost dark when the end of the wagon-road was reached at Copper Creek.

It is only seven years since the original settler, after whom this portion of the valley is named, took up his holdings here, and four years since the pack-trail above Canyon City was converted into a wagon-trail, but now the settlement consists of seven families, who have their own school and can reach Rock Creek by motor in three hours. Judging from the numerous inquiries received as to conditions, both as to soil and climate, there is no doubt there will be many additions to the settlement before next season.

For the first 17 miles above Westbridge, or as far as the old mining camp of Canyon City, logging operations have been carried on for the last ten years; many million feet of pine, tamarack, and fir have been driven down stream to the mills at Grand Forks and Cascade, and the cutting of this amount of timber has employed a large number of men each winter; many of these have taken up land of their own and there are some fine ranches extending through the valley.

There are some thousands of acres of logged-off land still held under timber licence, but when these revert to the Crown they will be readily taken up by settlers.

For 12 miles above Canyon City the valley is narrow and timbered and the land is chiefly held for its timber value. Thirty miles above Westbridge, the river having passed through a narrow canyon, the valley widens and a different growth is found, the timber having all been fire-swept and the new growth is chiefly black pine. The mountains on either side are steep and afford little or no pasturage till Copper Creek is reached, where there seems to be a break in the mountains to the west, and there is said to be good range extending through 4 miles to some small lakes on the headwaters of the Beaverdell.

My surveys commenced at the end of the wagon-road and continued north up the valley, which at this point is 1¼ miles wide, with the main Kettle River flowing at the foot of the mountain range on the east boundary. About half a mile north of here the river forks, the East Branch flowing from the north along the foot of the mountains, while the main river at this point comes in from the west, making a bend of three-quarters of a mile after flowing south for some miles parallel with the East Fork.

Between the two rivers there is a low divide of from 400 to 500 feet in height, whose slopes are more or less heavily timbered with black pine, with scattered tamarack on the foot-hills and fir on the ridge.

The bottom land, extending south from this ridge, lies in a series of low benches varying from 10 to 40 feet above the river-level and are of a light sandy soil, with thick outcropping of wash-boulders on the higher levels. There are many depressions where there is a deposit of from 6 to 12 inches of silt or clay above the gravel, and throughout all the flats there is a growth of vetch and pine-grass which affords pasture for the stock in the valley. The timber-growth on the bottom land is black pine varying in size from 3 to 6 inches and from an open park-like growth to that of a thicket. Parts of this have been fire-swept and there are hundreds of acres where there would be little or no clearing required, while none of it could be called heavy clearing.

The elevation of the valley at the end of the wagon-road is 2,900 feet, there being a 700-foot rise in the 45 miles from Rock Creek, and there is no appreciable increase in the next 8 miles.

The bottom land on the main river as far as Damfino Creek, or about 4 miles above my surveys, is about three-quarters of a mile wide and is of the same character as that already described; the mountains on the west, rising steep and rocky from the river-bottom and having been fire-swept, are bare, or in places covered with scrub, while on the east the slopes are not so steep and have small benches of green timber, chiefly black pine and fir.

The bottom land on the East Fork is of the same width but of a different nature; the sandy soil gives place to a silt or clay and the timber-growth becomes spruce and alder, with the river winding through the bottom from side to side for the next 4 miles above my surveys. Here the valley narrows and the river becomes a swift-running stream, with a steep mountain range on either side; the bottoms and foot-hills covered by a heavy growth of cedar, which will have a commercial value for poles and shingles.

There is an old trail running up the main river to its headwaters, and this season it was partly cut out and reblazed for some 20 miles and was connected with the mining camp on Lightning Peak in the hope that some day this would become a wagon-road, and the rich ores which are being discovered there would be carried through to the railway through the valley. There is seemingly a more direct route by way of the East Fork and Lightning Creek, and this season we converted about 5 miles of old survey-line into a first-class pack-trail, and I believe this could be continued on a good grade following an old trap-trail up the west side of the East Fork 8 miles to Lightning Creek, and thence due north up the creek to the summit.

The present settlers in the valley are growing hay, oats, and vegetables and running a few head of cattle, and as far as climatic conditions are concerned seem to have less extremes and more precipitation than in the lower valley.

Though there was still no snow or cold weather in the valley on November 1st, we discontinued work and moved out by wagon, making a new camp two days later in the Kettle Valley 5 miles west of Midway.

Ingram Mountain.

Here we surveyed 500 acres of high rolling bench land which has been held under pre-emption for twenty-five years. There were only 75 acres under cultivation, but the remainder is mostly open bunch-grass range, which is fenced and pastured. There are also some hundreds of acres to the south held under mineral licence on which no mining has been done for ten years, and this is also splendid range land.

Kerr Creek.

We also surveyed one lot on Kerr Creek, 3 miles north from the Kettle River and reached by a good wagon-road, over which many thousands of ties have been hauled to the railway. The valley of this creek is narrow and timbered and a few ranches are being cleared as the timber is cut off. The lot surveyed is near the headwaters of the creek and is rolling and timbered, and has been held under timber-sale and there are still some ties to be cut.

Roads.

The district covered this season, being one of the oldest settled and also the centre of the mining industry, is well supplied with good roads, for, besides the trunk roads in the main valleys, there are others, over which a car can be driven, running back to all the higher benches and valleys, and a prospector for either mineral or land can take a saddle-horse almost anywhere through the mountains.

Game.

The valley of the main Kettle River above Westbridge is a sportsman's paradise and is recognized as such throughout the district, so that it is no unusual sight during the fishing season to see cars parked any place along the road, and trout varying from 1 to 5 lb. are the catch for which people come miles.

Mule-deer are very numerous and the white-tail (which are protected in this district) are often seen. Black bear are numerous, and as one proceeds up the valley one hears of occasional

silver-tips, but it is not until one gets 10 miles above the wagon-road that one really reaches the haunts of the latter.

Beaver are quite plentiful in the valley, especially on the upper river, and as they are protected they are becoming more numerous. Nearly all the settlers have trap-lines and in the winter much other fur comes from the headwaters of the river.

I have, etc.,

ARTHUR H. HOLLAND, B.C.L.S.

HEADWATERS OF KETTLE RIVER, OSOYOOS DIVISION OF YALE DISTRICT.

BY H. H. B. ABBOTT.

KELOWNA, B.C., November 30th, 1921.

J. E. Umbach, Esq.,
Surveyor-General, Victoria, B.C.

SIR,—I have the honour to submit the following report on my survey operations this season for your Branch on the upper waters of the Kettle River:—

To avoid trouble from high water which would have greatly hampered, if not prohibited, work during the early summer, a start was not made until July 12th, when we left Kelowna with equipment and supplies on a 2-ton motor-truck and travelled via Vernon, Lumby, and Cherry Creek to the head of the Monashee Pass. We arrived here on July 13th, and were joined by our pack-train from Lumby. From here we proceeded by pack-train down McIntyre Creek to the Kettle River and made our first camp at Fish Creek, some 2 miles below the Kettle River Bar, the mouth of McIntyre Creek.

The balance of the month of July and most of August was spent in subdividing surveyed lands lapsed under the "Soldiers' Homestead Act" into 80- and 160-acre tracts. The bulk of these lands are of no great value from an agricultural standard, but in view of the prevailing tendency in this part of the Province to pre-empt anything whatever that is vacant, I don't anticipate it will be long till these are taken up. The two main drawbacks are elevation and lack of transportation, and the latter will to a considerable extent be alleviated by the completion of the Vernon–Edgewood Road. The other is rather more serious, as this country is at an elevation of upwards of 3,500 feet above sea-level, and I was surprised to find that we had frost every fine night throughout July and August.

September and the first three weeks of October were spent in making a traverse connecting these surveys with the surveys on the lower part of the Kettle River through a tie to the west boundary of the C.P.R. Lot 2714, a total distance of 23 miles. This traverse has been referred to Mr. Coryell's corner of Sections 11, 12, 13, and 14, Township 64, being the north-east corner of Lot 4785 and the north-west corner of Lot 4788 of my surveys. The general course of the valley has been followed with this traverse and the main topographical features have been tied in. Each mile of southing along the traverse from the point of reference has been marked by a legal post and bearing trees and the number of miles of southing marked on the post. A system of double-chainage in feet and chains was adopted and frequent observations taken on polaris to verify azimuth.

This portion of the Kettle River Valley is practically worthless, being neither agricultural land nor carrying timber of any merchantable value. The previous growth of timber had been largely cedar, but was almost entirely burnt out evidently over fifty years ago, and 80 per cent. of the present stand is black pine, the remainder being tamarack, spruce, poplar, and some fir.

Tamarack (western larch) grows thicker in this locality than anywhere I have seen, and towards the lower end of our work reaches a large size—trees up to 5 feet in diameter having been seen—but it will not pay to log. Above Brewer Creek the Kettle follows a canyon for about 2 miles and again enters a series of canyons about the 16-Mile post, and these continue with small breaks down to Damfino Creek. For the rest the valley averages about half a mile in width and is flanked by mountains rising to about 2,000 feet above the river. The valley consists mainly of jack-pine benches, and where a few open meadows occur these are very little above high water and the gravel is only a few inches below the surface.

A side-trip was made up into the Lightning Peak country in the latter part of September for the purpose of locating the headwaters of the East Fork of the Kettle River. To get there we followed a very third-rate trail leaving the main Kettle River Trail near the 14-Mile post; this route is not recommended except in circumstances such as ours, of finding ourselves in the locality at the time; there is a first-class trail into this country from the Fire Valley side. The various waterways on this divide were traced out and tied in by traverse to an existing road traverse made by A. H. Green, B.C.L.S., in 1920, and enough information secured thereby to correct existing maps of this area.

Time did not permit of my completing the rest of the work mapped out in my instructions—the resurvey of lands reverted under the "Soldiers' Homestead Act" on the Kettle River above the bar and in Fire Valley around Wauchope. Also, our horses suffered considerably from lack of feed at the lower end of the work and we were compelled to cease work and pull out in a hurry. We struck camp on November 2nd, and returning by the same route arrived in Kelowna on November 5th.

Accessibility.

The country can be reached by either of three routes: (1) Vernon, the Monashee Pass, and McIntyre Creek; (2) Edgewood, Fire Valley, and Kettle River Bar; (3) by trail from Westbridge, on the Kettle Valley Railway. With regard to the first two routes, there is a road at present under completion between Vernon and Edgewood which will at the least make a valuable branch to the Trans-Provincial Highway. From Vernon to the head of the Monashee Pass, a distance of 48 miles, this is old road-bed and under favourable conditions is passable for any loads, though the last 9 miles should, and easily can, be put on a much easier grade. From the Monashee this road was carried on by the use of interned enemy alien labour in 1916 to within a mile of the Kettle River, but owing to sluffing of rock from the Monashee Mountain this portion is not at present passable for wheeled traffic. From the Edgewood end the existing road some 9 miles up Fire Valley is being carried forward to close the gap, and I believe this year and last about 6 miles of new grade has been built, leaving some 15-odd miles to complete; this is at present served by the old pack-trail. This road will cross the Kettle River about 4 miles above the bar; diversions by good trail from the Monashee or Wauchope can be made to reach the bar and so to link up with the trail down the main Kettle, which ends in a wagon-road about 15 miles above Westbridge.

As concerns the main Kettle River Trail from Westbridge, it is a good pack-trail as far up as Damfino Creek, after which it becomes increasingly rough till Fish Creek is reached, where it again becomes a good trail. Much of it we found grown over and extremely hard to follow and we had to clear it out for about 20 miles. Also, from out 15-Mile post to Brewer Creek, a distance of about 14 miles, the trail crosses the river fourteen times. Though some of these crossings could be done away with, at least four of them are unavoidable, and as the river floods considerably in high water this trail becomes absolutely impassable for a month to six weeks at that time of year.

Mining.

The Lightning Peak country, which is about 35 miles from Edgewood, is best reached by pack-trail leaving the Fire Valley Road about 14 miles from Edgewood. There are many promising silver-lead properties, with also showings of gold and copper, on the Lightning Peak, but difficulty of transportation has greatly retarded development. Apparently financial reasons account for the fact that properties here are rarely, if ever, worked two years in succession, but there are two or three of these being worked nearly every year. This year Mr. Williams and his sons are working on the Lightning Peak Group, and I believe on the Rampalo there is also considerable development going on.

There are the beginnings of renewed activity around the Monashee this fall. Mr. Munson is working the old McIntyre Mine at the head of the pass and expects to keep a big camp here all winter. The Morgan Mine on the South Fork of Cherry Creek has been working all fall, and Mr. Rear is working an hydraulic proposition still lower down.

Game.

In view of its extent and remoteness, this is rather a disappointing game country throughout. Deer, some goat, the three species of bear and grouse are native to the district, but not very plentiful.

Fish Lake is very thickly stocked with rainbow trout running as high as 5 to 6 lb., and Keefer Lake, at the head of the Kettle River, gives even better fishing for the ordinary mountain-trout. Small trout are also fairly plentiful in the Kettle River itself.

CLIMATE.

The climate partakes more of the nature of the Kootenay than of the Okanagan climate, and while the snowfall is less than the average in the Kootenay, the rainfall is slightly greater.

I have, etc.,
H. H. B. ABBOTT, B.C.L.S.

PORTIONS OF KAMLOOPS, YALE, SIMILKAMEEN, AND KOOTENAY DISTRICTS.

BY O. B. N. WILKIE.

VICTORIA, December 20th, 1921.

J. E. Umbach, Esq.,
Surveyor-General, Victoria, B.C.

SIR,—My instructions for the season of 1921 were to carry on certain miscellaneous and inspection surveys. These surveys included parcels in Kamloops, Yale, Similkameen, and Kootenay Districts; the territory covered extending over a widely diversified area. In the different localities almost all of the important industries of British Columbia are represented.

Our party was organized at Merritt, which is the largest town and principal trading-point in the Nicola Valley and serves a considerable outlying agricultural and stock-raising district.

All business is well represented at this point, and in addition to the regular business carried on here it is the centre of some important industries. The Nicola Pine Mills, a large lumbering company, is located here and employs a large force of men. The McGorran Mill also turns out lumber and runs retail yards in Merritt.

To supply these mills logging camps are operating throughout the timbered areas, furnishing employment for many men. Settlers engage in logging during the winter season to a considerable extent, the returns enabling them to improve their ranches. During the past year camps up the Coldwater River were engaged in getting out tie-timber, for which there was a great demand. Mining-timbers are also supplied for the coal-mines at Merritt.

There are two coal companies operating at the present time, getting out a first-class quality of coal and employing quite a number of miners. Two or three other coal companies, which are at present closed down, are located here.

In the district tributary to Merritt considerable interest is shown in the development of mining for gold, silver, iron, copper, gypsum, etc. Bentonite has been found in quantity, and a deposit of calcium carbide has been opened up during the past year and a local company formed to carry on operations.

One of the most noteworthy of the various industries of this locality is silver-fox farming, there being several companies and individuals engaged in the fascinating occupation of breeding foxes for sale. It is claimed that fox-farmers in Merritt and vicinity own in the neighbourhood of $100,000 worth of foxes. It is the largest station in this line in British Columbia.

Merritt is the centre of an agricultural district, where general farming and cattle-raising are the principal sources of income. It is particularly suitable for cattle, as the mountains surrounding the valleys furnish excellent pasture for stock. Peavine and bunch-grass grows profusely. Many settlers are making good ranches on upland pre-emptions; numerous small streams and lakes furnishing water for irrigation and domestic purposes. The Nicola Valley is irrigated for the most part from the Nicola River.

Wheat, oats, barley, etc., make good crops on the lower levels, while hay is successfully grown on the mountain ranches. Grain, potatoes, and the hardier vegetables mature up to an altitude of about 2,500 feet. Sheep seem to do well and hogs especially well.

It is not a fruit-growing section, but the small fruits do well and some of the hardier varieties of tree-fruits.

More dairying is done each year and in the summer of 1921 considerable cream was being shipped to outside points.

Timothy and clover hay grows remarkably well and alfalfa makes a good crop, but is a little harder to get a stand.

A branch line of the Kettle Valley Railway connects Merritt with the main line of the Canadian Pacific Railway at Spences Bridge, 42 miles distant, and Brookmere, on the main line of the Kettle Valley Railway running from Vancouver to Nelson.

From this point some pre-emptions, applications to pre-empt, and British Columbia Government lots were surveyed and isolated lots tied in at Lower Nicola, Coyote Valley, Douglas Lake, Clapperton Creek, and Aspen Grove.

Upon completing this work we proceeded by way of the main Merritt–Princeton Automobile-road through Aspen Grove, the Otter and Tulameen Valleys to Coalmont; the latter being a small station on the Kettle Valley and Great Northern Railways, where coal-mines are in operation. There is also a general store, post-office, and hotel.

Granite Creek.

We made camp at Granite Creek, about a mile east of Coalmont, on the Tulameen River. Granite Creek is remembered by the old-timers as the scene of one of the gold-rushes of the early days. In 1885 gold was discovered and almost overnight it became a booming mining camp of 4,000 or 5,000 inhabitants. It is now practically abandoned as a mining camp, although individual prospectors still pan gold in small quantities from their placer claims.

We surveyed the old camp as a Government reserve and the occupied portions were laid out as a townsite; the old cemetery being laid out as a Government lot. Some applications to pre-empt were surveyed near this point. The general character of the country is rough and mountainous, with an elevation in the valley of around 2,000 feet.

Similkameen Valley.

Our work being finished in this locality, we broke camp and moved by way of Princeton to a point in the Similkameen Valley, which is a wide and fertile valley, well watered, and many successful ranches are found there.

Princeton, lying at the junction of the Tulameen and Similkameen Rivers, is a flourishing town where all lines of businesses are fairly well represented. It also has coal-mines in operation and a few miles out is the British Columbia Copper Company, one of the largest copper-mines in British Columbia. This plant is now closed down on account of the low price of copper.

The main line of the Kettle Valley Railway passes through Princeton and railway connections can be had via the Great Northern Railway to points south across the International Boundary by way of Oroville and Spokane, Washington.

Around Princeton some miles out, in the upland country, some Government land suitable for cattle ranching and farming may be found.

Our next camp was located at Soukup Creek, which lies about midway between Princeton and Hedley, in the Similkameen Valley. Here two recorded pre-emptions were surveyed.

At Hedley, on the Great Northern Railway, about 20 miles south-east of Princeton, is located one of the largest gold-mining companies in the Province.

Keremeos, farther south in the same valley, is the centre of a very fine fruit- and vegetable-growing district and has several packing and canning plants. The climate is favourable for the growing of tender vegetables such as tomatoes, and a good income is made from growing them for the canning companies.

The Kootenay Power and Light Company, with plant located at Bonnington Falls, near Nelson, supplies power and light for the towns in the Similkameen Valley, extending the service as far as Princeton and the British Columbia Copper Company.

Our next surveys were to be made in the Kootenay District, near Goatfell and Kingsgate. To reach this point we went by train over the Kettle Valley Railway's main line to Nelson, passing through Penticton en route.

Penticton and South Okanagan.

Penticton is situated at the lower end of Okanagan Lake and is the principal town in the Southern Okanagan fruit-growing district, and a popular summer resort as well. Thousands of boxes of apples and other fruits were shipped from the Okanagan Valley the past season, which compares favourably in quality with the best imported fruits.

About 30 miles below Penticton the British Columbia Government has taken over a large area of land and is constructing a concrete irrigation system to irrigate it for settlement. The new town of Oliver is located near the centre of this tract. Good roads traverse the entire district.

NELSON AND VICINITY.

Nelson, the end of the Kettle Valley line, is the largest town in the Interior of the Province and a distributing-point for many smaller towns and country districts. It is beautifully situated on the Kootenay River near the point where it flows out of Kootenay Lake. Canadian Pacific boats furnish connections with the Crowsnest branch, joining the main line at Medicine Hat. The Great Northern Railway furnishes transportation to points across the boundary and connecting with Spokane.

Some fruit is grown in the territory surrounding Nelson and general farming, dairying, and cattle-raising is carried on. The principal industry, however, has been mining, some good mining properties being located in this vicinity.

NEAR GOATFELL AND KINGSGATE.

From Nelson we went by boat and train to Goatfell and Kingsgate, where several old surveys were inspected and amendments made. In general this section of the country differs greatly from that of the Kamloops or Similkameen Districts. Little irrigation, if any, is required for the production of crops. The timber is heavier, with more underbrush, and consists principally of fir, cedar, tamarack, and hemlock. It is not so good a range country for cattle, the vegetation being less plentiful.

Logging is one of the principal industries, numerous large mills being located in this section.

The Crowsnest branch of the Canadian Pacific Railway serves the district and the Trans-Provincial Highway is completed from Kootenay Lake to the Alberta boundary.

In the immediate vicinity of Goatfell and Kingsgate the settlers are engaged in general farming, but at Creston and Yahk, only a few miles distant, fruit is successfully grown, Creston, more particularly, making large shipments of fruit during the season.

Nelson, Cranbrook, and Fernie are the principal towns and distributing centres for the South Kootenay District. Trail, about 20 miles from the International Boundary, is a town of some importance, the Consolidated Mining and Smelting Company being located there. This is the largest smelter in the Province.

NORTH THOMPSON VALLEY.

Upon finishing the work assigned to me in the Kootenay District, we proceeded by way of Kamloops to a point about 70 miles up the North Thompson River to Blackpool, where we surveyed several recorded pre-emptions and new applications.

The North Thompson Valley is a wide, fertile valley, narrowing in places to the river, and traversed by the Canadian National Railway. Fair roads extend along the river on either side for about 100 miles, several ferries at various points giving access to the railway.

The soil in the valley is a rich sandy clay, and, as the elevation is only about 1,200 feet, the climate is favourable for the production of fruits, vegetables, and all farm products. There are numerous prosperous ranches and in the lower part some good cattle-ranches. Dairying is successfully carried on, creameries being located at Heffley Creek and at Kamloops.

At Barriere and Chu Chua, on the Canadian National Railway, there are large general stores which appear to do a thriving business, as well as smaller stores at other points. A coal-mine is in operation at Chu Chua, and near Blackpool a large concentrator for the reduction of ores has been built, but it is not in operation at the present time. Considerable mining is done in the adjacent territory.

Kamloops, the second largest town of the British Columbia Interior, is located at the junction of the North and South Forks of the Thompson River. It has two railways, the Canadian Pacific and the Canadian National, and is a division-point on both. It has grain-elevators, large hardware and implement houses and creamery, and is the principal supply-point and market for a prosperous agricultural community. General business is well represented in all lines and the Land Registry Office and Government office is located here.

Telephone systems are in operation over all the territory covered by my season's work.

Throughout the wooded, mountainous regions considerable trapping and hunting is done in the season. Fur-bearing animals are plentiful and consist principally of coyote, lynx, marten, fisher, beaver, bear, mink, and ermine. Deer, ducks, and geese furnish good shooting.

In all these districts the raising of poultry, turkeys, and geese in connection with general farming or as a separate business is successful and a good source of income. There is a good demand for all such products.

I carried on surveys up the North Thompson until stopped by extraordinary snowfalls the last of November, and I then returned to Merritt, where my party was disbanded.

I have, etc.,

O. B. N. WILKIE, B.C.L.S.

RESURVEY, SATURNA ISLAND.

BY H. E. WHYTE.

VICTORIA, B.C., September 29th, 1921.

J. E. Umbach, Esq.,
Surveyor-General, Victoria, B.C.

SIR,—I have the honour to submit the following report regarding the survey carried out on Saturna Island to re-establish and define the boundaries of lands which had not been Crown-granted, and to resubdivide such land so that each quarter-section should have all posts planted and at least three boundaries run:—

After digging for three days I located the broken glass that had been placed under the original post at the south-east corner of Section 11 at the head of Narvaez Bay. The original survey made in 1874 was commenced at this point; hence I began my work at the same place and was able to locate the original position of all posts thereafter, even though some of the country had been badly burnt and the original survey had been made forty-seven years ago.

Saturna Island is very rugged, consisting of two ranges of hills, rising to approximately 1,100 feet, separated by a narrow valley running from Lyall Harbour to Narvaez Bay, the highest point in this valley being about 300 feet above sea-level. The hills are steep, rocky, and broken on the south side, while on the north, though steep, the surface is not so rocky and broken.

Communication with the island is maintained by the C.P.R. boat "Island Princess," sailing from Victoria in the summer and Deep Cove in the winter. Calls are made bi-weekly.

There is a post-office and store on the west end of the island and a wagon-road about 4 miles in length runs easterly through the centre; the last half-mile, near Narvaez Bay, has yet to be graded. The town of Sidney, on Saanich Peninsula, is about 16 miles distant.

A great portion of the island is rock, the balance being sandy loam, with a small area of bottom land. There is only a small portion fit for cultivation.

The area is as a whole heavily timbered, chiefly with cedar, fir, and balsam. Logging has been done in the valley running easterly from the head of Lyall Harbour. The south-west quarter of Section 11 was being logged at the time of survey. Clearing would cost in the neighbourhood of $300 per acre.

The climate is mild, being very similar to that of Victoria. Deer and grouse are plentiful.

I have, etc.,

H. E. WHYTE, B.C.L.S.

SAYWARD DISTRICT.

By JOHN DAVIDSON.

VANCOUVER, B.C., January 20th, 1922.

J. E. Umbach, Esq.,
Surveyor-General, Victoria, B.C.

SIR,—I have the honour to report on the past season's surveys undertaken in the Sayward District, and in adjacent portions of Range 1, Coast, and New Westminster Districts.

The work was divided into two portions—the subdividing into blocks of from 40 to 80 acres of those portions of logged-off lands found suitable for settlement, and a triangulation survey between unconnected land and timber surveys on the Coast, which at the same time formed the basis of an accurate map of the shore-line.

OWEN BAY.

The most extensive subdivision survey was made at the head of Owen Bay, on Sonora Island. Here, out of an area of 2,100 acres of an expired and logged-off timber licence, 790 acres were surveyed as suitable for settlement and cut up into fourteen blocks, each containing between 30 and 40 acres of agricultural land.

Owen Bay is situated on the north shore of Okisollo Channel, at the west end of the Hole in the Wall, and is an indentation 1 mile in depth and half a mile in width. Its waters are well sheltered by a group of small islands at the entrance, which, while protecting it from the south, do not impede navigation by the ordinary coastal steamship.

It is about 130 miles north-westerly from Vancouver, from which there is a weekly service by the Union Steamship Company's steamers to Wyatt Bay and to Churchhouse. Owen Bay is about 3 miles from Wyatt Bay and 9 miles from Churchhouse. At each place there is a post-office and good general store, and Wyatt Bay has the added advantage of a telephone service communicating with the Dominion Government Telegraph.

The rapids of Okisollo Channel and of the Hole in the Wall, which later are only navigable for a short period around slack water, detract from the accessibility of Owen Bay, but as navigation in the whole district is similarly governed by the tides, there is less inconvenience than would be anticipated.

The shore-line of Owen Bay is bounded by steep bare rocks, with small shingle beaches in the narrow indentations, and a long stretch of muddy sand at the head, bared for about 20 chains at low tide. On the east shore for the first 40 chains surveyed the rock bluffs of the shore rise steeply into a rugged hillside, broken up by shallow ravines and old watercourses, and the enclosed area of land between the shore and the mountain is unfit for any agricultural purpose. The remainder of the shore-line surveyed, including the head, is low; the rocks, rising 10 to 20 feet above sea-level, immediately give place to a deep deposit of sandy loam or loam.

The vegetation along the shore-line is a luxuriant growth of the usual berry-brush, salmon-berry and thimble-berry predominating. The merchantable timber has been logged off and only a few hemlocks and cedars are left.

On the west shore there is no land suitable for cultivation. A steep, high rocky ridge rises from the shore, the crest being about 20 chains back from the beach, and running parallel to the shore it continues north-easterly, separating the block surveyed from St. Aubyn Lake.

Along the foot of the easterly slope of this main ridge flows the main drainage creek of the land to the east. This creek rises in the swamp meadows towards the north-east corner of the block and drains two-thirds of the area surveyed. In summer it is about 15 feet wide and 1 foot deep and nowhere is it swift. The land drained by it, rising gradually and evenly, is fairly flat, but is broken up by a few small ridges which run at right angles to the main ridge. There are a few swamp meadows throughout the area, but sufficient fall can be obtained to efficiently drain them.

Throughout there is an exceptional depth (for the Coast) of good soil with a clay subsoil. A detailed description of each parcel is part of the field-notes.

On the east shore of Owen Bay, through Lots 1174 and 1175, the land rises steeply to a low ridge and then drops quickly to Hyacinth Lake. The soil here is a sandy loam with a clay subsoil, and except where the granite rock outcrops is from 3 to 6 feet in depth, with the usual

tangled growth of salmon-berry brush amongst the old logging-slash and young alder. Hyacinth Lake is a shallow body of water half a mile square, covered with water-lilies and bordered with beds of white hyacinths. Its average depth is about 8 feet and the bed is covered with 2 or 3 feet of soft mud, deposited by the main feeder from the north-east. The outlet is at the north-west corner of the lake. It is about 15 feet wide and 2 to 3 feet deep and falls rapidly to the sea, dropping about 40 feet in the first 200 yards of its course. Sufficient power could be developed from it to furnish light to a small settlement.

The main feeder of the lake flows in through Dorr's pre-emption at the north-east corner and is a gently flowing stream 6 feet wide and 18 inches deep. It rises amongst the ridges about half a mile east of the lake, and as it drains a good watershed it rapidly increases in size before it reaches the string of swamp meadows through which it flows to the lake.

These meadows can be readily drained by clearing and deepening the creek-bed and ditching towards it. The soil is a deep deposit of black muck over clay loam with a clay subsoil. Wild hay has been cut on a few of these small meadows for some years by Dorr, who has cleared about 8 acres on his pre-emption and grows excellent vegetables, including tomatoes. Another feeder of Hyacinth Lake rises amongst the ridges south-west of the lake, and after a short, swift descent through a deep, well-timbered draw flows quietly over a gravel-bed through a small flat of good soil, shaded by hemlock and spruce to 18 inches, where it enters the lake at the south-west corner.

St. Aubyn Lake is about a mile due north of the head of Owen Bay. At the east end of the lake there is an area of about 10 acres of easily cleared swamp land of a muskeggy nature. The creek, which enters the lake here, flows through a narrow valley with steep side-hills and has cut a deep channel in a gravelly soil.

The outlet is a wide, shallow stream flowing gently for the first half-mile of its course, and then more swiftly as it enters a narrow valley at the foot of the main ridge on the west side of Owen Bay, and down which it continues till it reaches the sea in Okisollo Channel, about half a mile west from Owen Bay.

The only land with agricultural possibilities bordering on the lake was found on the banks of this creek, the remainder of the lake-shore being bounded by steep, well-timbered slopes, with low rock bluffs at the water's edge. A trail was cut all the way up this creek in 1919 by the Fisheries Department when making the stream passable for salmon. A shorter route to the lake is obtained over a low pass in the main ridge from near the head of Owen Bay to this trail.

Timber.

Except for about 80 acres north-east of Hyacinth Lake covered by a timber-sale, the merchantable timber has been logged off. The new growth is of young hemlock, except along the old skid-roads, where it is entirely of alder. There are scattered patches of hemlock to 20 inches and occasionally larger cedar. The old slashing is now a tangle of down-timber, limbs, and dense berry-brush, with clumps of young hemlock. A detailed report of the timber in the area was made by Mr. McVickar, of the Forestry Service, in April, 1920.

Clearing.

To clear an area large enough to make a producing farm within a reasonably short period of time the use of machinery is advisable, and as few individual settlers have sufficient capital to warrant the purchase of a donkey-engine for stumping and piling, co-operative settlement is essential. The cost of clearing would be about $400 per acre. Again, in marketing the produce in the local market—that is, in the logging camps—a certain steady supply of produce is necessary to meet the needs of the camps. To ensure this some kind of co-operation is needed amongst the settlers.

Climate.

Weather conditions are very similar to Vancouver. There are no summer frosts. The rainfall averages between 70 and 80 inches. The land is suitable for mixed farming, and small fruits and apples grow well in the neighbourhood.

Game.

Deer are more plentiful here than in any other part of the island, and the same might be said of the cougar. There is a fair showing of young grouse and several small flocks of wild

pigeons were seen, apparently nesting here. Ducks are numerous in the fall. Good fishing can be had at any time in the rapids, as well as salmon-fishing in the season.

Many inquiries were made regarding this area by intending settlers and I anticipate that all of this land will be applied for within a year.

Cahnish Bay, Quadra Island.

Five lots were surveyed for settlement on the south shore of Cahnish Bay. They are from 40 to 80 acres in extent and are more readily cleared than the average. The logged-off areas have been well burnt and not as yet reseeded to any extent, while the original forest-growth on the remainder seldom exceeds 20 inches in diameter.

The land rises fairly steeply from the shore, but none of it is high. The whole area surveyed lies between two main creeks, both about 20 feet wide, and which, entering the south boundary about 60 chains apart, flows parallel for almost a mile, when the most westerly creek turns a right angle and joins the other just before reaching the sea.

The land is broken up by many ridges, on all of which the soil is light and shallow, with rock-outcrops in places, but in the flats good soil is found. The area is suitable for grazing land and good skid-roads make any part of it readily accessible.

Granite Bay lies 2 miles to the east. Here there is a school, post-office, and general store. A good road follows the old railway logging-road up the valley towards Village Bay, on the east shore of Quadra Island. When the logged-off lands adjacent to this old logging-road are opened up for settlement, judging by the productivity of the land at present cultivated, Granite Bay should be the port of a thriving farming community. Several prospects in this valley have had a considerable amount of development-work done and trial shipments have been made of a gold-bearing copper ore.

Thurston Bay Forest Ranger Station.

Surveys were made at Thurston Bay of a reserve for the Forestry Branch of the Lands Department. This included the survey of foreshore, of two small islands, and of the various improvements made.

An extensive plant has been assembled here for the building and the repair of patrol-boats for the Forest Service. Power to run the plant and to light the buildings is obtained from Florence Creek, a turbulent stream rising in Florence Lake, and which, like all small Coast streams not glacier-fed, fails for about two weeks in the hottest part of the summer.

The station is fitted with a wireless telephone, which is successfully used in communicating with the patrol-boats and with Vancouver. Under favourable circumstances I was able to hear a gramaphone being played in a wireless station south of Los Angeles.

The land surveyed here has no agricultural possibilities, being steep, rough side-hills with rock-outcrops, but covered with a heavy growth of poor timber. From the north boundary near the north-west corner photographs were taken looking north and south along Nodales Channel, a typical passage in this district.

Near Thurston Bay, in Cameleon Harbour, several families have settled on the land subdivided in 1919 and a start made to clear and cultivate the land. Good vegetables were grown there this season, the soil proving to be very productive.

Estero Basin.

At the head of Frederick Arm booming-grounds were surveyed for the benefit of those logging in Estero Basin. This was done in conjunction with the Forest Service.

Triangulation Surveys.

The triangulation stations were marked by permanent monuments, the main quadrilaterals being defined by iron pins set in holes drilled in rock and marked with the station number. Secondary stations were defined by drilling a hole in the rock and inserting a wooden plug; in this a copper tack was set.

Each station was witnessed by a triangular wooden post, with the number of the station inscribed on it, set in a rock mound, and wherever possible bearing trees were also used.

For sighting, a tripod was made of peeled poles 18 to 24 feet long and from 4 to 6 inches in diameter. This was erected over the station and plumbed carefully by the aid of a cord hung

from the true intersection of the poles. The ends of the poles were set in rock mounds or wedged in cracks in the rocks, and where necessary were further strengthened by braces nailed across the base. In some cases platforms were of necessity built to stand on when reading the angles.

NODALES CHANNEL.

This work was commenced on the west shore of Sonora Island about 3 miles north of the entrance of Okisollo Channel. Here a base-line was carefully traversed and ties made to Chatham Point Light. The triangulation system was then carried up Nodales Channel to join the last season's work at Johns Point and Owen Point. Existing surveys were tied to and Howe, Hardinge, and the Lee Islands surveyed. The unsurveyed portions of the shore-line were defined by intermediate stations.

BLIND CHANNEL (MAYNE PASSAGE).

Ties were made from Bickley Bay, on Thurlow Island, to Lot 1437 on the Mainland, and a connecting traverse run along the shore between Lot 1433 and S.T.L. 10603P; this to define Timber-sale 2627.

CARDERO CHANNEL.

The triangulation carried out in 1920 covered Cardero Channel from Johns Point to Henry Point, and this season it was carried southerly to Gillard Island Beacon from a new base-line traversed on the shore opposite Henry Point. All of this season's work here was in the Euculta Rapids, which are only navigable for a short period of time around slack water, and rarely for more than an hour at any one time, unless travelling with the current. The average tug-boat with a boom of logs takes two favourable tides to make the journey through, tying up on the south shore of Dent Island for the first night. With rowboats and an overboard engine the navigation of the rapids between survey stations was found to be very interesting and at times exciting. The whole party were glad when this part of the work was completed. Little Dent Island, Gillard Island, and several smaller islands were surveyed, as well as the unsurveyed channels. Ties were made to existing surveys and doubtful locations cleared up.

CALM CHANNEL, NORTH PASSAGE, AND PRYCE CHANNEL.

A base-line was run on the south end of Stuart Island, and from here a system of triangles was carried south to Rendezvous Island, east through North Passage to Ramsay Arm; thence along Pryce Channel to Elizabeth Island on the north shore, and to the lime-quarry on Redonda Island. An extension was also carried north to tie to Gillard Island Beacon, so that there is a triangulation tie from Chatham Point up Nodales and down Cardero, through Calm Channel, and along Pryce Channel.

Stations were so placed that at some future date the system can be extended through the Arran Rapids to Bute Inlet, southerly down Calm Channel to connect with last season's work on Cortes Island, up Ramsay Arm, and along Pryce Channel to Toba Inlet. As in the other systems, ties were made to existing land and timber surveys and the unsurveyed coast-line carefully mapped.

A tie was also made to the old Indian reserve on Sonora Island north of the east end of the Hole in the Wall, the north boundary of which was re-established. From this reserve a low divide forms another route into the land surveyed at Owen Bay. This reserve was abandoned by the Indians in favour of the newer reserve at Churchhouse, where there is a large church, school, and quite a number of pretentious houses. Here most of the Indians spend the winter, their fishing-fleet finding sheltered anchorage in front of the village.

The reserve at Orford Bay, the south boundary of which was redefined this season, is becoming popular with these Indians in the summer and several new houses are being erected.

GENERAL.

Lumbering is the chief industry of the district covered by this season's work, and during 1921 1,200 men were employed in logging in the various camps. Over 100,000,000 feet of fir, cedar, and hemlock, valued at about $1,000,000, were cut and about 1,300 acres were logged off. In addition to the logging, several small lumber and shingle mills gave employment to about 100 men.

FISHING.

The salmon-fishing was very poor here this season and the pack was light. Cod-fishing amongst the several rapids keeps a few boat crews busy the year round, and two dogfish-oil factories engage a few fishermen in the winter months.

MINING.

There was practically no development-work done this year. Much money has been spent on the various properties in previous years and trial shipments have been made from time to time. Prospecting was carried out as in former years and good reports were heard of some new and some old locations.

A lime-quarry is being operated on the north shore of Redonda Island for the Whalen Pulp and Paper Mills Company, Limited, and regular shipments made to Mill Creek of an almost pure limestone.

I have, etc.,
JOHN DAVIDSON, B.C.L.S.

SAYWARD AND RUPERT DISTRICTS, AND RANGE 1, COAST DISTRICT.

BY M. W. HEWITT.

VANCOUVER, B.C., November 2nd, 1921.

J. E. Umbach, Esq.,
Surveyor-General, Victoria, B.C.

SIR,—I have the honour to submit the following report of the surveys made by me during the past summer in Sayward and Rupert Districts, and Range 1, Coast District:—

Leaving Vancouver on June 13th, I took steamer to Quathiaski Cove, proceeding from there by wagon to Lot 113, immediately adjoining the Cape Mudge Indian Reserve.

This lot has been thoroughly logged and was very completely burnt in the dry fall of 1919. Within its boundaries I laid out Lot 126, covering Pre-emption Record 353, using, as far as could be determined, the old corners established thirty years ago; the balance, including some vacant Crown land to the north-east, I cut up into lots running from 33 to 65 acres.

The surface is very uniformly level, rolling slightly, the ridges running approximately north and south; these are composed of gravel, for the most part clear of boulders, and will furnish an inexhaustible supply of excellent road material. The sides of the slopes are composed of a dark-red sandy loam, mostly free from stone, which seems capable of raising good crops of fruit and vegetables, judging from gardens on similar soil seen around Quathiaski. The bottoms are mostly swampy, but have sufficient fall to be easily drained, the soil varying from sandy to clay loam. The subsoil, as far as could be determined, is a mixture of clay and gravel, the clay in some places having a marly appearance. There are two considerable open swamps of wild hay on the lot, besides numerous smaller ones.

The vegetation is, for the most part, that usually found on logged and burnt fir land—bracken, fireweed, and blackberry-vines on the ridges, with wild grass, red blind-nettle, wild mimulus, and sorrel in the bottoms. On the south end wild columbine is prevalent and since logging the big Scotch or bull thistle has come in very universally. I was also very sorry to find in one place on the grade of the old railway a very flourishing patch of the noxious Canada thistle. There are no well-defined creeks on the lot; adjoining farms find an apparently plentiful supply of water in shallow wells.

Being surrounded by occupied and improved lands, the lot is well served by a good gravel road, which crosses it diagonally, with a fork at the south end, one branch crossing the south boundary at about its centre and the other crossing the east boundary, giving a connection to Quathiaska and Heriot Bay, distant respectively about 4 and 8 miles. Besides this, there is the grade of the old logging-railway, which can very easily be made to give access to all lots not otherwise served. The general elevation is about 200 feet above sea-level.

On completion of this I proceeded to Gowland Harbour, where I resurveyed the very rough and extremely rocky North-west Quarter of Section 215, covered by Pre-emption Record No. 261, and on completion of this proceeded to a camp on the shore of Lot 165, making a survey of Lot

230, covering the vacant Crown land immediately to the east of Lot 166. This piece of ground is also very rough and rocky. This completed the work in Sayward District.

From here I moved camp to Beaver Creek, on the west side of Loughborough Inlet, where I subdivided portions of Lot 29, Range 1, Coast District, the portions subdivided being the easterly point included between Sydney Bay and Beaver Creek, and the extreme westerly portion of the lot.

The greater part of the easterly portion was logged a considerable time ago and is now grown up with a dense second growth of fir, cedar, hemlock, and alder. The ground rises sharply from either shore, the top being on an easy incline both ways from the central ridge. The soil is mostly clay and clay loam, with occasional outcrops of rock.

At the time of the survey in the latter end of July a number of small streams were found along the shore-line, and Mr. Green, on Lot 1467, had good water in a shallow well, which, however, dried up just before we left; the elevation is from 100 to 200 feet above sea-level. The portion of the western end subdivided has been partially logged recently, but there is still a considerable amount of hemlock standing, and there are also a number of fir logs and cedar shingle-bolts cut and left lying in the woods.

The surface is mostly flat and slightly rolling, with a general elevation of about 300 feet above sea-level. The soil varies from gravelly loam to clay loam. There is a creek of considerable volume on Lot 1470 and a smaller one on Lot 1468.

I also tied in by triangulation the land surveys on the east side of Loughborough Inlet to the surveys on either side of Beaver Creek. In this triangulation, as in all others made by me, a careful traverse of the shore was made for a base-line, selected so that the two extremities were visible from one another, thus securing a check by a comparison between the bearing as read and the bearing as figured.

From here I proceeded to Jackson Bay, Topaz Harbour, where I investigated a reported overlap between Lots 569 and 36. Leaving here, a day and a half by gasolene-launch brought us to Fort Rupert, where I tied the two ends of the Geodetic Surveys base-line to the adjoining land surveys. I then crossed Queen Charlotte Sound and tied in by triangulation the Geodetic Surveys station on Numas Island to the land surveys on the Mainland, following this by a triangulation of Wells Passage and Canoe Pass to tie the surveys on Broughton Island to those on the Mainland. On completion of this I made camp on Hayle Point, on the east end of Broughton Island, and tied in by triangulation the Burdwood group of islands and the land surveys on Gilford, Baker, and Broughton Islands to those on the Mainland, making also a stadia traverse with transit angles to locate and tie in the various islands of the Burdwood Group.

Leaving here, I made camps in Port Harvey and Chatham Channel, tying in by triangulation the surveys on Cracroft and Hull Islands to the surveys on the east side of Havannah Channel, and also the surveys on Cracroft Island to those on the north side of Chatham Channel. I also from these camps subdivided portions of two expired timber leases—Lot 70 on Cracroft Island and Lot 31 on the Mainland. Of Lot 70, the lowest and best portion is covered by Lot 105. Of the remainder, a good deal was found to be unfit for subdivision, being mostly mountain and rock bluff; five lots, however, were laid out, one fronting on Port Harvey, one inland, and three fronting on Chatham Channel. The first two are mostly low-lying, the soil being a sandy loam on a subsoil of clay; the other three rise steeply from Chatham Channel to an elevation of from 100 to 200 feet, followed by a short gradual northern slope, breaking into a long, even, southern slope towards Port Harvey, the soil of these being gravelly. All have been very thoroughly logged, the only timber of any commercial value left being a fair sprinkling of cedar poles. On Lot 31 I laid out five lots fronting on Chatham Channel and on the bay behind Low Island.

The front of Lot 31 is low and flat, the back rocky hills, unfit for subdivision, carrying a considerable stand of hemlock timber and some fir and cedar. The low ground only has been logged. The land subdivided is of excellent quality, the soil being a brown clay loam, very wet at the time of survey owing to the heavy rains in September and October, but with plenty of fall for drainage and carrying a considerable growth of swamp-grass. In addition to the lots surveyed, a good 80-acre lot could be got behind Lots 1877 and 1878 and a lot to the east of Lot 1878, fronting on the water. I was anxious to survey these, but the weather was so bad during the last week of my stay that I was forced to abandon the idea of this.

I surveyed Low Island as Lot 1476. It is composed principally of boulders and has been, I think, the medial moraine of the Call Creek Glacier. It has a maximum elevation of 10 feet above sea-level and carries down the centre a belt of scrubby fir and a considerable growth of wild grass round the edges, which should afford good summer grazing. It has no water.

I have, etc.,

M. W. HEWITT, B.C.L.S.

WEST COAST, VANCOUVER ISLAND.

BY A. W. HARVEY.

VICTORIA, B.C., November 30th, 1921.

J. E. Umbach, Esq.,
Surveyor-General, Victoria, B.C.

SIR,—In accordance with instructions received, I have made certain surveys on the west coast of Vancouver Island during the season of 1921.

My first work was making a connection from Drinkwater Creek, which runs into the head of Great Central Lake, to the head of Bear River, which empties into Bedwell Sound. I found on reaching Della Lake that I could not get through the Bear River Pass owing to heavy snow, so I triangulated to a sharp mountain-top and completed the work by continuing Colonel Leach's traverse up Bear River and triangulating to the same peak. I then made several connections from the Bear River traverse to old surveys, surveyed Warn Island and connected it by triangulation to Lot 506, and connected Indian Reserve No. 8, Kennedy River, to Lot 612. I then surveyed a pre-emption in Cypress Bay, which completed the work in the neighbourhood of Clayoquot. I left Clayoquot on the steamer on September 3rd intending to go into Hesquiat, but the weather was very rough and we were unable to land there, so I had to proceed to Centre Island, Esperanza Inlet, where I partially surveyed seventeen lots, being recalled early in October by yourself. A further two weeks' work would have completed this survey if the weather was fine. These lots all lie in one block on the south side of the entrance to Esperanza Inlet. The country is rough and broken, with small patches of good land in places, but the clearing is very heavy and it would take years or the expenditure of a great deal of money for a settler to bring even 10 acres under cultivation. I completed my season's work by a triangulation connecting old surveys on Alberni Canal which were found to be very incorrect.

I have, etc.,

A. W. HARVEY, B.C.L.S.

COAST TRIANGULATION, FITZHUGH SOUND TO ELLERSLIE CHANNEL, RANGES 2 AND 3, COAST DISTRICT.

BY J. T. UNDERHILL.

VANCOUVER, B.C., November 30th, 1921.

J. E. Umbach, Esq.,
Surveyor-General, Victoria, B.C.

SIR,—I have the honour to submit the following report upon my season's work in Ranges 2 and 3, Coast District:—

Work was conducted in a similar manner to previous years, but owing to the narrowness of many of the smaller channels the actual distance of triangulation carried out was less, although eighty stations more were occupied this season than last. The immense amount of detail covering innumerable small islands, rocks, lagoons, etc., naturally kept down the length of the triangulation chain.

FITZHUGH SOUND.

This body of water is probably so well known as to require few remarks from me. Its west shore, bounded by Calvert, Hecate, Nalau, and Hunter Islands, differs considerably from the mainland shore to the east. All of the above islands are poorly timbered with hemlock, cedar, spruce, and pine, and many comparatively open patches of muskeg with scattered timber are

seen from the water. What timber there is gets gradually better and better as you proceed northerly from Queen Charlotte Sound.

The east shore is generally better timbered and slopes back more gently from the shore-line. Room for a few pre-emptions may be found along this shore. The tidal effect in the channel is very noticeable from the entrance of Hakai Pass to the mouth of Burke Channel, particularly on the ebb. Practically all of the Burke Channel tide sweeps out through Hakai Pass, thus creating quite a set in that direction.

Owing to Nalau Pass closing down to a few chains in width there is little tidal set in that direction. A curious wind effect is noticed with the prevailing west winds of summer. It enters by way of Hakai Pass and then divides, blowing up-channel to the north and down-channel to the south. This creates a nasty sea in the area off Koeye River, particularly when the tide is ebbing and when big swells are coming in from Hakai. With a south-east or south-west blow, quite heavy weather is common in the lower part of Fitzhugh from Addenbroke Island south.

South-west Coast, Calvert Island.

This shore-line, which was traversed from the vicinity of Cape Calvert to Lot 911, is exceedingly rough and broken. Being fully exposed to the open Pacific and pounded by surf for centuries, the shore-line has been broken into a mass of small, deep, and narrow bays, islands, rocks, and reefs, the intervening softer material having been washed away. Reefs and rocks extend out some little distance to sea, and on a rough day broken water is visible in almost any direction. The land immediately adjoining this traverse is totally unsuited for agricultural purposes, being rocky, with only a scattering of surface soil. Scrub, cedar, hemlock, and spruce, with pine, badly wind-swept, covers the shore for some little distance back from the water.

Lot 715.

This pre-emption on the north shore of Safety Cove lies on a steep mountain-side, moderately well timbered with red and yellow cedar, hemlock, and occasional spruce. Owing to Safety Cove being the nearest suitable shelter for boats about to cross Queen Charlotte Sound, this property may be of some little value, but its agricultural possibilities are negligible. It has little soil and rock-outcroppings occur throughout the Lot.

Hakai and Nalau Channels.

These channels, with adjoining bodies of water, bear little resemblance to the same as shown upon charts, particularly Nalau Channel or Pass. Nalau and Hakai Channels are connected by smaller channels which I named Edward and Ward. The latter splits what is shown as Nalau Island into two parts. Besides these there are a number of small inlets and lagoons, and also a great number of small islands, islets, rocks, and reefs, not shown on the chart. Hakai is exposed to the open Pacific and is rarely free from large rollers, which break even as far in as its junction with Fitzhugh Sound. While tying in the islands in this vicinity all reefs noticed were also tied in, this practice being carried out generally during the season, the information thereby gained being invaluable for navigation purposes. Nalau Pass, except at its immediate junction with the Pacific, is always calm, being well sheltered. This channel is far different from same as shown on the chart. After leaving Fitzhugh Sound it narrows down to some 7 chains in width, and then opens up very slightly to its junction with the Pacific. At this point there are a considerable number of reefs, and unless one is acquainted with the locality he should exercise great caution in taking a boat through same.

Owing to surf a great deal of trouble and delay was caused in getting at some of the more exposed stations. Fog was also a cause of delay. The Japan Current undoubtedly touches the Coast in this area, and due to its warming influence and the excessive moisture this summer we were seldom free from heavy fog in the late evening and early morning.

As regards the islands in this vicinity and also the shores of Hunter and Hecate Islands, they are very much broken wherever reached by surf. The timber is of no commercial value, being small and stunted, bearing abundant evidence of its exposure to Pacific storms. Owing to the lack of fresh water in this vicinity it is doubtful if the adjoining land can be used for commercial purposes. The tides in Hakai Channel are strong, as through this pass practically all the tidal waters of Burke Channel must pass. The tide is also strong in Nalau Narrows, but has small volume.

KILDIDT SOUND AND WEST COAST, HUNTER ISLAND, TO SUPERSTITION POINT.

Kildidt Sound bears a strong resemblance to the latest blue-prints showing same, but no semblance to the chart. Its lower end, being exposed to the open Pacific, has a very rough and broken shore-line. In this area are a great number of small islands, rock, reefs, inlets, and lagoons, all of which were investigated and tied in. At the north end of Kildidt Sound is a large lagoon connected with the sound by a narrow body of water. This lagoon extends northerly well into the interior of Hunter Island. The lagoon itself consists of two fairly large bodies of water connected by a narrows. In the lower lagoon are several islands close to the entrance to the inner lagoon and also at its western extremity. The narrows connecting this body of water to Kildidt Sound can only be used at slack water owing to the swift current and reef in the vicinity of its entrance.

The area lying around the south-west corner of Hunter Island is nothing like the same as shown upon the chart. Spider Island and adjoining islands as shown thereon are in reality a great number of small islands, besides which there are a great many more not shown on existing charts. These islands are separated generally by narrow channels, affording excellent shelter in stormy weather. One good channel, fairly free from reefs, permits a sheltered course for boats through this area, except for approximately 2 miles in rounding Superstition Point. Caution should be exercised in navigating any of these waters owing to the number of sunken rocks and reefs, and, although it may seem absurd, the danger of losing one's way.

With the exception of Kildidt Lagoon, the timber in this area is of little use commercially, being stunted and badly wind-swept. In Kildidt Lagoon, however, a few small stands of good cedar and spruce were seen, particularly on the flat land at its head. It is doubtful if this country will ever be used for agricultural purposes, the smallness of suitable areas, inaccessibility, and probable lack of water in dry years being very much against it. Owing to the number of interesting channels, lagoons, bays, sheltered nooks, etc., its great possibilities for an ideal summer resort at a future date, providing water and weather are suitable, are most promising. By weather I mean rainfall; there are any number of excellent shelters for small craft in stormy weather.

SUPERSTITION POINT TO BELLA BELLA VIA CHOKED PASSAGE, PLUMPER CHANNEL, AND LAMA PASSAGE.

This stretch of water for purposes of description might better be divided into two parts—namely, Choked Passage and vicinity, and Plumper Channel and Lama Passage. The first, as well named, is a continuation of Plumper Channel choked with a great number of small islands, islets, rocks, and reefs. Despite this, Choked Passage affords an excellent inside channel for travelling down the west side of Hunter Island, and not till within a mile of Superstition Point are open waters encountered. By taking the most easterly channel between the islands, water practically free from reefs can be used. The islands and the shore of Hunter Island in this area are generally poorly timbered with stunted, wind-swept cedar, hemlock, and spruce of no commercial value. The tides in Choked Passage are strong wherever the channel is narrow, and a bad tide-rip is frequently seen in the vicinity of Superstition Point. None of the land in this area, other than small parcels, is really suitable for agricultural purposes.

Plumper Channel, being unexposed to the Pacific, presents a more regular shore-line. It is used by fishing-craft heading out to the open Pacific, being the most convenient channel connecting the main inner steamboat course with outside waters. Except where it enters the Pacific, there are few reefs to be avoided. Quite a strong tide runs in this channel, as portions of the waters of Dean and Fisher Channels find access through it to the sea. As in Fitzhugh Sound, a noticeable improvement in the timber may be seen as one gets farther from the ocean, but at best the timber on its shores is of poor grade. A few pre-emptions have been taken up, more particularly on the Campbell Island side, but as their development has not been pushed to any extent, it is difficult to form an estimate of their possible agricultural value.

Lama Passage, a portion of the main navigation channel of the Coast, is so well known as to require no remarks from me.

Bella Bella, one of the largest Indian settlements on the Coast, is situated near its northern extremity and is dependent almost entirely on the fishing industry for its existence.

Just north of this point Lama Passage joins Gunboat Passage, and here a tie was made to T. H. Taylor's triangulation of the previous summer.

Ellerslie Channel and Bay.

This channel was surveyed for its upper 22 miles, the lower part having been previously done. It is bounded by high, rocky mountain-sides, generally well timbered with hemlock, cedar, and spruce. About 12 miles from its head it narrows down very considerably, and at this point on its east shore Ellerslie Bay breaks off to the east. Several large creeks enter the channel in its upper reaches, most of which are capable of developing considerable electrical power. The tides in this channel have a fair flow, being more noticeable in its upper 12 miles. Several parties of hand-loggers were operating along its shores, the logs being taken to Ocean Falls for pulp or lumber purposes. No land of any consequence suitable for agricultural purposes was noticed.

Climate.

The area of the Coast covered by me this year is well known for its damp climate. This season was exceptionally wet, no less than sixteen days' rain in June, ten in July, and thirteen in August. Local residents and others who have spent their summer there for some years state that it was one of the wettest they have ever experienced.

Quite a difference in temperature is apparent between the inside channels and the open Pacific. The Japan Current washes the westerly shores of the islands in this area, and the warmer waters of same are the cause of heavy fogs, from which in fine weather we were seldom entirely free. Fog on an average about 200 to 300 feet in height would commence to settle at dusk and sometimes not rise till after noon the day following.

The prevailing winds of summer are strong westerly blows, getting up between 8 and 9 a.m. and dying down with sunset. This summer, being extremely wet, we had an exceptional amount of south-east and south-west winds.

Minerals.

With the exception of Ellerslie Channel and the south-west coast of Calvert Island, the absence of visible mineral indications was most remarkable. In no other stretch of British Columbia Coast have I seen such an entire absence of same. Even the wash and float in the creeks by which we camped were lacking in this respect.

Staking-posts of a few claims were seen on the south-west coast of Calvert Island, and in Ellerslie Channel iron-cappings, with here and there copper leachings, were noticed. Insufficient time to investigate further precludes giving more information on this subject.

Game.

On no part of the Coast have I seen Coast deer in such numbers. Calvert Island in particular abounds with them. Does with yearling bucks and fawns were seen on almost every island of any size. Owing to this area being away from the hunter's general haunts and hard to get at, it should remain well stocked for years to come.

Plover and snipe in abundance were breeding on almost every rock on the western or exposed sides of the islands, sharing these rocks with the sea-gulls. A few geese breed at the upper end of Kildidt Lagoon and in some of the smaller lagoons. Ducks, while not lacking in numbers, do not appear to be breeding in this area. Trout were found in all streams fished.

Of fur-bearing animals seen, mink were the only ones in numbers. Beaver are present in the swampy area in the interior of Calvert Island.

Marine Life.

The marine life in Fitzhugh Sound, Ellerslie Channel, and Plumper Channel is similar in all respects to the inner channels of our Coast. In the waters lying out to the west of the islands, however, a very great increase in the amount and size of marine life is noticed. This is probably due to a large extent to the Japan Current. Shell-fish, such as barnacles, mussels, etc., grow to several times the size of those on the inside waters. Mussels over 12 inches long were found. The shallow water close inshore teemed with numerous sea animals of great variety of shape and colour, and many forms of sea vegetation not seen on the inside Coast were noticed. A fair number of whales, blackfish, sea-lions, seals, and fish common to British Columbia were seen.

I have, etc.,

James T. Underhill, B.C.L.S.

COAST TRIANGULATION, SURF INLET TO CHATHAM SOUND, RANGES 3, 4, AND 5, COAST DISTRICT.

By A. E. Wright.

Prince Rupert, December 5th, 1921.

J. E. Umbach, Esq.,
Surveyor-General, Victoria, B.C.

Sir,—I have the honour to submit the following report on my survey operations during the past summer, consisting of the triangulation of the outlying channels from the head of Grenville Channel to the vicinity of Surf Inlet, the survey of the Lawyer and Kinnahan group of islands in Chatham Sound, and the survey of certain pre-emptions and purchases on McCauley Island:—

Where possible permanent marks were left at all stations. These marks consist of iron pins driven into drill-holes in the solid rock, wooden posts, or drill-holes themselves from 3 to 5 inches deep. All were referenced by bearing trees where available. Ties were made to certain Dominion Hydrographic Stations on Telegraph Pass, Ogden Channel, and at the entrance to Surf Inlet, as well as to the stations on the summit of End Hill and Dolphin Island.

The first shores to be triangulated were those between the foot of Telegraph Pass and the head of Ogden Channel. A very satisfactory base-line was measured on the east shore of Kennedy Island opposite Claxton, and the triangles brought down Telegraph Pass, tying on to monuments at the head of Grenville Channel.

Kennedy Island is a prominent granite-mass, with steep sides heavily timbered with cedar, spruce, and hemlock. It lies between Arthur and Telegraph Passes in the immediate delta of the Skeena River.

The waters on the north and east are very shallow, with many drying mud-banks. South of Kennedy Island a chain of low islands extends southerly to within 1½ miles of the north end of Pitt Island. They are named in order Marrack, Bedford, Lambert, Gibson, and Bloxam Islands. The steamboat-channel passes south of Gibson and Bloxam Islands and swings north for Arthur Passage, passing west of Kennedy Island. There are unwatched lighthouses on Watson Rock, a quarter of a mile south-west of Gibson Island, and on a rock in the centre of Arthur Passage.

Lewis Island lies a mile west of Kennedy Island, being separated from it by Arthur Passage. To the west of Lewis Island is a narrow gas-boat passage named Kelp Pass, separating it from Porcher Island. Lawson Harbour is a protected bay at the north-east end of Lewis Island, where a small settlement and a miniature shipyard for fishing-boats and gasolene-launches has been established.

At Oona River, on Porcher Island, about 3 miles south of Lewis Island, there is a larger settlement of prosperous fishermen and loggers, principally of Scandinavian origin.

Ogden Channel.

This is a deep channel about a mile wide and 7 miles long, which separates Porcher Island from Pitt Island. The steep and rocky shores are covered with a fair growth of cedar, spruce, and hemlock. Several bodies of water come together at the south end of Ogden Channel.

Kitkatla Inlet bears away in a north-westerly direction towards the centre of Porcher Island, one arm terminating in Dries Bay and the Serpentine, a mile south of Welcome Harbour, on the north coast, and the North Arm terminating in a large salt lake which extends to within three-quarters of a mile of Jap Inlet, also on the north coast. The south end of Kitkatla Inlet is a mass of islands and rocks, some of which are large and well timbered.

The main entrance to Ogden Channel is through Beaver Pass, which separates McCauley Island from Spicer Island. There is a lighthouse about half-way along the pass. Opposite Beaver Light, on McCauley Island, three families have settled.

Two pre-emptions and a purchase of 80 acres were surveyed here. The soil is the usual muskeg of the Northern Coast, with subsoil consisting of gravel or clay, although a large portion of the muskeg lies directly on the solid rock. The settlers all have very good gardens, but the soil requires a great deal of preparation. Their main source of income is fishing and hand-logging.

Two and a half miles south-west of Beaver Light, at Murder Cove, a small sawmill has been established. It is operated by water-power, the water being conveyed around the hill in an open flume and conducted to a Pelton wheel through a home-made square wooden pipe. In clear weather there is not enough water to operate successfully. The logs are supplied by hand-loggers and the lumber is mostly used in boat-building. Two gas-boats were in course of construction when Murder Cove was visited in November.

Another entrance to Ogden Channel is through Schooner Pass. This pass separates Spicer from Dolphin Island. It is half a mile wide and 2 miles long and with Beaver Pass opens out into Browning Entrance.

On Dolphin Island, Kitkatla, one of the largest Indian villages of the Northern Coast is situated.

Both Spicer and Dolphin Islands are rather rough, attaining an elevation of about 800 feet, and are covered with muskeg and a scrubby growth of hemlock, red and yellow cedar, and jack-pine.

North of Dolphin Island lies Goschen Island, with a high rocky summit about 1,000 feet in height. It is separated from Porcher Peninsula by Freeman Pass. The tide runs very strongly in all these passes, attaining a strength of 6 knots in Freeman Pass.

PETREL CHANNEL.

Petrel Channel separates McCauley from Pitt Island. It is about 25 miles long and varies from 30 chains to 2 miles in width. The shores are steep and rocky and covered with scrubby hemlock, red and yellow cedar, and jack-pine. Captain Cove and Newcombe Harbour are two good ships' anchorages on the Pitt Island shore. Captain Cove is used by tug-boats as a harbour for the storage of Davis rafts. The rafts are brought over singly from Queen Charlotte Islands, the same tug being able to handle two rafts from there to the sawmills at Prince Rupert, Swanson Bay, and Ocean Falls.

There is good hemlock, spruce, and cedar on the banks of most of the creeks flowing into Petrel Channel from Pitt Island. The best of it is pretty far back, but it will no doubt be logged off some day.

Hevenor Inlet is a long narrow inlet running south-easterly into the centre of Pitt Island from a point on the shores of Petrel Channel 3 miles north of its southern end. It is from 20 to 60 chains wide and 13 miles long, with a narrows 8 miles in that can only be navigated at slack water. The shores are fairly well timbered, but a rather large percentage of the timber is balsam. At the foot of Petrel Channel is a maze of unnamed inlets and channels which extend into Pitt Island for a considerable distance, although only the principal ones were traversed. The timber on these inlets is very fair for the most part, consisting of hemlock, spruce, balsam, and cedar.

Anger Island is low and rough. It lies 2 miles south of the end of Petrel Channel and is badly cut up by inlets and lakes.

Principe Channel separates Banks from Pitt and McCauley Islands and extends the full length of Banks Island. It varies from 1 to 5 miles in width.

BANKS ISLAND.

Banks Island is 46 miles long and 11 miles wide and presents a much less rough appearance than does Pitt Island. At the north end a considerable area has been surveyed as pre-emptions and purchases and a few pre-emptors were living there this summer. Lettuce to the value of $700 is said to have been shipped to Prince Rupert from a clearing of considerably less than half an acre. The centre of Banks Island is fairly mountainous, but the intervening valleys do not seem to contain any timber of commercial value. The south end of the island is also flat and probably contains several lakes and inlets entering from the outside. The only indentation on the Principe Island side is Colby Bay, about a mile deep and 10 chains wide at the entrance.

The McCauley Island shores of Principe Channel are low, but very rough, and cut into by deep bays which were not surveyed. Port Canaveral is a surveyed ships' anchorage near the south end of McCauley Island on Principe Channel.

South of Anger Island is a deep, wide bay named Mink Trap Bay, with several inlets running in from the head. The passage behind Anger Island is rather shallow in places, with several

rocks. Three inlets extend for 3 miles into Pitt Island from this channel. South of Mink Trap Bay Principe Channel widens, gradually merging into Nepean Sound.

Port Stevens is a surveyed ships' anchorage on the Pitt Island side about 8 miles south of Mink Trap Bay. An inlet of the same name extends 6 miles easterly into Pitt Island from half a mile south of Port Stevens.

Nepean Sound, with a width of 7 miles, is the southern continuation of Principe Channel. Its western and eastern extremities are named Otter Pass and Otter Channel respectively. Otter Pass, separating Banks and Estevan Islands, is a dangerous channel 1½ miles wide, partly choked with islands and rocks. The tide attains a strength of 6 knots at springs, forming dangerous tide-rips.

Otter Channel separates Pitt and Campania Islands. It is 4 miles long and 1 mile wide at the narrowest place and is free from dangers, though the tide runs strongly. Both the ebb and flood tide appear to flow westerly from Squally Channel into Nepean Sound.

Squally Channel lies to the east of Campania Island and extends northerly along the east shores of Pitt Island for 6 miles north of Otter Channel. Here it narrows down and, as Union Pass, connects with Grenville Channel. Union Pass is narrow and twisted and is used by gas and tug boats only. The east shores of Squally Channel are formed by Farrant, Fin, and Gil Islands.

Farrant Island is the most northerly and is fairly well timbered with cedar, hemlock, and jack-pine. Between Farrant and Fin Islands lies Cridge Pass, which was triangulated in 1920. Lewis Pass lies to the south and east of Fin Island, which it separates from Gil Island.

Gil Island is 7 miles wide and 17 miles long and is fairly well timbered with hemlock, red and yellow cedar, and spruce.

Whale Channel separates Gil Island from Princess Royal Island. It has two entrances north and south of Passage Island. Ties were made to stations left at the entrance of Whale Channel and Cridge and Lewis Passes in 1920.

Campania Sound is the southern continuation of Squally Channel and is bounded by Campania, Princess Royal, and Aristazable Islands, and is open to Hecate Strait between Campania and Aristazable Islands, where it is 8 miles wide. A portion of Campania Sound has been surveyed by the Hydrographic Survey and ties were made to two of their stations at the entrance to Surf Inlet.

SURF INLET.

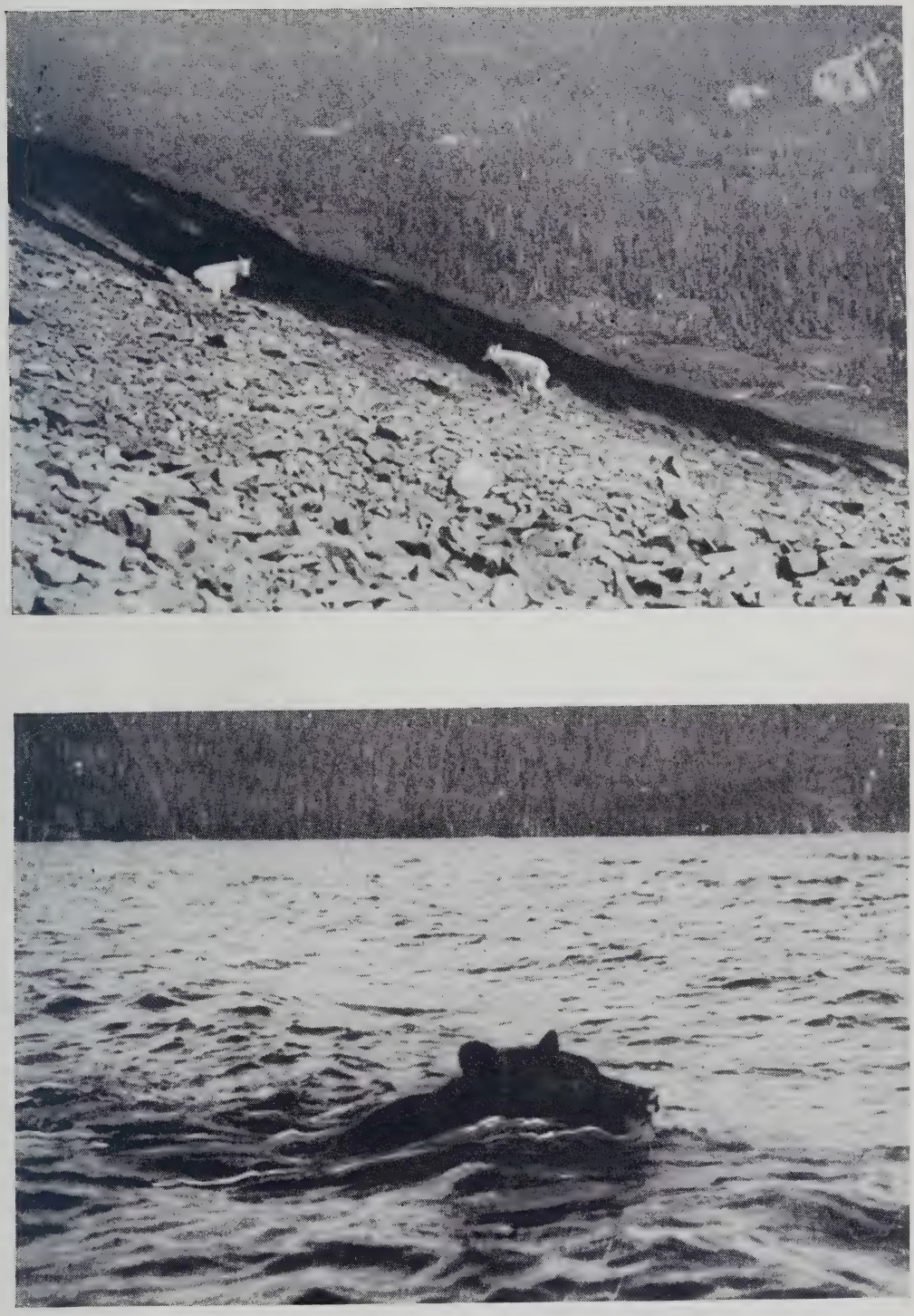
Surf Inlet is an indentation half a mile wide and 14 miles long. At the head are the wharf, bunkers, and power plant of the Belmont-Surf Inlet Mines, Limited. The power is developed from a large creek flowing into the head of Surf Inlet. The dam, which is practically at tide-water, has formed one large lake out of the Cougar, Bear, and Deer Lakes.

The ore is crushed and concentrated at the mine and brought a short distance by a narrow-gauge railway to what was Bear Lake. The loaded cars are then run on a scow, brought down Bear and Cougar Lakes to the dam, and thence down a short incline to the bunkers.

After triangulating to the entrance of Surf Inlet we moved to River Bight, on Whale Channel. It flows into Whale Channel about 5 miles from the north end of Princess Royal Island, and its appearance when the tide is running out certainly resembles a large river. The entrance, 3 chains wide, can only be navigated by gas-boats, and by these only at slack water and a short time before and after. Inside it widens out to from 20 to 40 chains and extends for 7 miles into the island, dividing into two arms when 3 miles in. The timber is very good as a whole and several good patches of spruce and hemlock were seen. An old trail exists connecting the head of the South Arm of River Bight with Deer Lake, and one can reach the Surf Inlet mines by this route.

After completing the triangulations of River Bight the party left for Prince Rupert, and on arrival there commenced the survey of the Lawyer and Kinnahan groups of islands in Chatham Sound. The Lawyer Group consists of several small islands 2 miles north-east of Porcher Island. A lighthouse is on the largest island.

The Kinnahan Islands lie about 2 miles south-west of the entrance to Prince Rupert Harbour. They consist of two large and two small islands. They are rough and rocky and have no safe harbour. The timber is scrubby hemlock, cedar, and jack-pine. A small light is situated on the north-east shore.



Two typical game animals of the Coast Mountains. Upper picture shows mountain-goat; lower, grizzly bear swimming.

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INDUSTRIES.

Logging, fishing, and mining are the industries that are likely to be developed in the area triangulated. In time it is possible that certain portions will be farmed, but the cost of preparation and the isolated condition of the arable portions will prevent farming on a large scale. There are, however, many small areas which in time will be taken up by fishermen.

All the logging, with the exception of some in the vicinity of Surf Inlet lakes, has been carried on by hand-loggers. The great number of lakes and inlets on the west portion of Pitt and Princess Royal Islands makes it a convenient district to log by that method. Owing to the closing of Swanson Bay only one hand-logger was working in the vicinity surveyed, though two booms of logs were seen anchored in sheltered coves, the owners being unable to sell them at that time.

On the lakes at Surf Inlet J. R. Morgan, of Prince Rupert, has been logging for some time, the logs being rafted down the lakes and shot over the dam into salt water at Surf Inlet Wharf. There seems to be some difficulty in selling the cedar and there is some possibility of a shingle-mill being established here to take care of that part of the cut.

Estevan and Campania Islands have practically no timber that can be handled profitably by present methods.

FISHING.

There are no canneries established in the area triangulated, as all the salmon caught are taken to Lowe Inlet or Prince Rupert. There are several good salmon-streams on Pitt, Banks, and McCauley Islands. Gill-nets are never used and all fish are caught by purse or drag seines.

During bad weather in Hecate Strait many of the smaller halibut-boats fish in the sounds and wider channels where shelter can be reached quickly.

Great quantities of herring are caught in the spring and a large herring-pound was established at Captain Cove in the early part of this year.

MINING.

The rock formation consists of masses of granite of the Coast batholith and the highly metamorphosed schists and sedimentaries of its western contact. The largest operating mine is that of the Belmont-Surf Inlet Mines on Princess Royal Island. This mine is at the present time the largest gold-producer in the Province and there are several good prospects in the same vicinity.

On the east coast of Porcher Island, on Pitt Island and other points along Grenville Channel, a very good grade of moquetite is found, but so far no development has been undertaken other than that required for assessment purposes. Surface showings of copper are found on Porcher and Gibson Islands.

Many leases have been granted from time to time for the purpose of quarrying limestone and marble, but no development has been undertaken except on the north-east shore of Banks Island, 4 miles south-east of End Hill. Here several 4-inch drill-holes were put down several years ago to test the size and quality of the deposit. Within a quarter of a mile of these workings a prospect showing chalcopyrite in a lime formation is seen.

Other places where lime or marble can be found are on Gurd Island in Kitkatla inlet, on Banks Island opposite Mink Trap Bay, on some islands in Mink Trap Bay, and on certain of the Surf Islands in Campania Sound.

CLIMATE.

The climate throughout the area triangulated is typical of the Northern Coast, being mild, with varying degrees of rainfall. At the heads of inlets which separate the higher mountains the rainfall is much heavier than at the outer and more open coast-line. A difference can be seen and felt when entering even a short inlet, and the nature of the timber alone is sufficient to show this difference. While places such as Surf Inlet, Swanson Bay, Lowe Inlet, and the interior of Pitt and Princess Royal Islands have a precipitation which in certain years amounts to 280 inches, it is doubtful whether the outer islands will exceed 100 inches on the average. The snowfall is heavy in the inlets and channels between the higher mountains, but the outer islands, such as Porcher, McCauley, Banks, and Aristazable, have practically none.

GAME.

The small Coast deer is very plentiful on the seaward islands and there are considerable on the larger islands and Mainland Coast. They swim freely from island to island. Black bear are found on the higher islands, but there do not seem to be any on the outer islands, such as Banks and Porcher Islands. A species of white bear (Kermode's) is found on Princess Royal Island and Gribble Island and they have been seen as far north as the Skeena River near Terrace.

Goats are found on the Mainland and on Pitt Island, but there are none on Princess Royal Island nor on any of the outer islands. There are a large number of wolves on all islands with the exception of Porcher Island. An odd one is seen at times there also, but the settlers have practically exterminated them.

A few geese nest on the muskegs and bays of the outer islands, but the large flocks, which spend the winter on the bays and tide-flats, for the most part nest in the Far North. Most of the edible varieties of ducks do not arrive until the end of September, having also nested in the marshes of the North. Blue and willow grouse are found on all the islands, but they seem to have been scarce this year.

In all creeks which are not actual cataracts several varieties of trout can be caught, and several species of cod and flatfish may be taken with hook and line in salt water. Many whales were seen in Whale and Squally Channels, and the entrances to Beaver and Schooner Passes are a favourite sporting-ground for dolphins. Hair-seals are seen everywhere, but sea-lions are not nearly so numerous. Clams are found on all flat beaches except those near the mouths of large creeks. They are not exploited at present, but ruins of clam-canneries can be seen at Welham Creek, on Spicer Island, and on the east shore of Fin Island.

All the area triangulated can be reached by launch from Prince Rupert. There are post-offices at Claxton, at the mouth of the Skeena River, and at Surf Inlet. Steamers call weekly at Surf Inlet, Lowe Inlet, and Claxton, but for any one contemplating a visit to these waters the best point of departure is Prince Rupert.

I have, etc.,
A. E. WRIGHT, B.C.L.S.

TRIANGULATION AND RECONNAISSANCE SURVEY, KITLOPE VALLEY AND TAHTSA LAKE, RANGE 4, COAST DISTRICT.

BY F. C. SWANNELL.

VICTORIA, B.C., January 17th, 1922.

J. E. Umbach, Esq.,
Surveyor-General, Victoria, B.C.

SIR,—I have the honour to send in herewith report on the season's operations.

Six weeks at the commencement of the season were spent in endeavouring to get a tie across from Gardner Inlet to the headwaters of the Kimsquit River, in order to obtain a check on the triangulation between the 53rd parallel as run and the Coast triangulation. Owing to the exceedingly inclement weather and the abnormal depth of snow in the mountains intervening, a direct tie by a rigid triangulation was impossible in the time at my disposal. I, however, mapped the Lower Kitlope River and lake and carried a traverse and triangulation 30 miles inland from tide-water, from which point I succeeded in tying into some of my previously fixed peaks on the eastern fringe of the Coast Mountains. The area mapped on the western side of the Coast Mountains is about 1,500 square miles.

While I was endeavouring to reach Kimsquit Lake, Mr. Blane, of the Water Branch, made the attempt by the main Kitlope River, and succeeded after a very arduous and adventurous trip in reaching the Chatsquot Branch of the Kimsquit River.

Returning to Gardner Inlet the beginning of July, I went around to Ootsa Lake via Prince Rupert, ascended the Tahtsa River, and spent the remainder of the season mapping Tahtsa Lake and the passes leading over to Kemano Bay and Gardner Inlet. All this region is now tied by triangulation to Ootsa, Whitesail, and Eutsuk Lakes, and the end of the survey of the 53rd parallel by R. P. Bishop, B.C.L.S.

Kitlope River.

At the head of Gardner Inlet is a mile of tide-flats into which Kitlope River swings sharply around a long rocky spur. The river is 500 feet wide, turbid with glacial silt, and the current only rapid at low tide. Tidal water backs some 5 miles up-stream. This stretch of the river is through bottom land, of which several hundred acres are open meadow, only flooded at times of extreme high water or when the river is in flood. The Kitlope is joined half a mile from its mouth by a smaller river, the Tsaytis, which heads to the north and is not navigable. The Kitlope as far as the Indian shacks at the head of tide-water is cut into numerous channels and back sloughs, some of which are dry at low water. Above this is 3 miles of fairly swift water with numerous bars and sloughs.

At Mile 8 Kitlope Lake discharges almost directly into the river by a short reach, whose current, striking the main river at right angles around a rock bluff, forms strong eddies and small whirlpools. Above the junction with Kitlope Lake the river-valley swings east by south-east, the river becomes swifter, is more cut up by bars and side-channels, is full of riffles and drift-piles, and its navigation is very dangerous. Skilled canoe-men can, however, navigate it up to the forks at Mile 24.

Mr. Blane informs me he reached a small lake at the head of the North Fork or Kapella, 36 miles from salt water. Crossing a short divide at an elevation of 1,390 feet, he reached Ear Lake, the head of the Chatsquot Branch of Kimsquit River.

Kitlope Lake and Tezwa River.

Kitlope Lake is 8 miles long, three-quarters of a mile wide, lies 30 feet above sea-level, and is entirely mountain-walled except at its upper end. Anciently it formed part of Gardner Inlet, which then extended south to the forks of the Tezwa; the 8 miles between the present head of the inlet and the lake having been filled up by deposits from the Kitlope River, while the two branches of the Tezwa have silted up the upper 8 miles of the ancient inlet. The mountains rise sheer, in many cases precipitously, from Kitlope Lake for 3,000 feet, then round off into glacier-capped summits. The scenery is of the grandest description, the glacial torrents falling directly into the lake in wild cataracts. Apart from fan of detritus at the torrent-mouths, there is no beach nor flat land except at the head.

Tezwa River and Pass to the Kimsquit.

The Indian name of the river entering from the south is, as nearly as I can represent the sound, "Hwuis-u-Tezwa." My Indian informant gave me to understand it was a place-name only, without meaning in his language. I have called the river by the last two syllables, or "Tezwa."

We ascended this river by boat for 6 miles, the first 4 miles being very easy water. A mile and a half from the lake a large rapid stream 60 feet wide enters from the north-west. This smaller river soon becomes a torrent and heads in 10 miles in the wild jumble of peaks west of Kitlope Lake.

The main Tezwa at 6 miles up is 100 yards wide, 3 feet deep, and running swiftly over a gravel-bed. For 5 miles its right bank has hugged the base of the Kitlope Mountains. A mile wide strip of flat land, the silted-up bed of the ancient extension of Gardner Inlet, lies to the west for 6 miles. This is mostly open swampy meadow with numerous beaver-ponds. A narrow strip of timber and bushes separates this from the river.

Cross-valley Lake to the Kimsquit.

Seven miles from Kitlope Lake the river forks, the main water coming in from the west after a tortuous 3-mile course through a wide gravel flood-bed. These forks split up into glacial torrents fed by an amphitheatre of huge glaciers ringing the valley-head. The East Fork for a mile or so loops and twists in the Old Gardner Inlet depression. Into this it cuts its way in canyon down a narrow valley, whose sides, almost precipitous, are glacier-capped. This valley, or it might be more aptly termed cleft, we could trace for 12 miles. The cross-valley occupied by the West Fork extends eastward, but is only occupied by an inconsiderable stream.

Six miles east of the forks there is a low trough section divide (about 1,500 feet altitude), with open swampy meadows and scattered scrub timber. The exploration was not carried beyond this point. The valley eastward could be seen to widen out and deepen, and Kimsquit Lake

almost certainly lies in it. This is reported to have been an old Indian route from Gardner Inlet to Dean Channel. Four several mountain ascents were made. In every case nothing but an appalling welter of glacier, snow-field, and jagged peaks were visible as far as the eye could carry the whole ring of the horizon. All the mountains of this region are of one type and there are no definite ranges. From the deep narrow valleys the mountains rise almost precipitously to about 3,000 feet altitude. For miles there will be absolutely no chance of making an ascent. Above this altitude they break into ridges or round out into huge snow-fields. Everywhere are glaciers, some several square miles in area.

LAKE REGION SOUTH AND WEST OF OOTSA LAKE.

Ootsa Lake lies entirely out of the Coast Mountains. The western third only of Eutsuk Lake lies in the mountains, and rather over half of Whitesail Lake is hemmed in by mountains. Troitsa, Tahtsa, and Nanika Lakes are, however, typically mountain lakes. The whole lake system occupies deep depressions running south-westerly directly into and cutting the main Coast Range at right angles. These depressions continue westward to the deep coastal inlets, the divides between the Coast rivers and these large lakes being close to the latter and only averaging 1,500 feet above their level.

The lakes themselves, including the most north-westerly one, Morice Lake, lie at much the same altitude—2,700 to 2,800 feet above sea-level. Of all these lake depressions, that occupied by Ootsa Lake and Tahtsa River and Lake is the straightest, and Tahtsa Lake itself most deeply penetrates into the range, its western end being only 22 miles from Kemano Bay, Gardner Inlet.

TAHTSA RIVER.

Entering the west end of Ootsa Lake as a wide sluggish stream, flowing through swampy meadow land and dense willow bottom, Tahtsa River comes from the westward in the deep depression above referred to. At 4 miles up, to the left of a low brushy point, the widening called Sinclair Lake, fed by Whitesail River, opens out to view, Tahtsa River itself opening out inconspicuously to the right through low willow bottom. The river is sluggish for nearly 20 miles above Ootsa Lake, although the low flats along the lower reaches change into broken bench country largely burnt over.

At 17 miles from the mouth the steep grassy spur of a high hill-range runs directly to the river. From Mile 20 to Mile 22 the river is very tortuous, riffles are frequent, and there are two rather nasty turns. We then enter almost 12 miles of dead water with low banks and large areas of meadow and brushy bottom on either hand, the benches and low hill-spurs only extending occasionally to the river. The country back of the river-flats is worthless, both as regards timber and soil.

Between the river-valley and Whitesail Lake lies a broken hill and bench country with numerous small meadow-ringed lakes. The soil is gravelly or rocky and the timber burnt or fallen. At Mile 34 the Tahtsa runs swift and shallow over a gravel bottom. Thirty-six miles up-stream a burnt rocky hill, a spur of Huckleberry Mountain, juts into the river. After 3 miles of badly cut-up river running swiftly with many sharp turns, a second long reach of dead water occurs which might almost be termed a shallow mud-bottomed lake. Spruce bottoms and willow-swamps extend half a mile back to the south.

At 42 miles up the river becomes a perfect maze of channels, is very swift, and choked with dangerous drift-piles.

There is only one route by which a canoe can be taken. We had to chop through drift-piles and portage several times, and one particularly swift chute we barely made aided by an Evinrude engine, a pole in the bow, and three men ahead with a line. There are 10 miles of this bad water; then 2 miles of swift but good water to Tahtsa Lake. The surrounding country is very broken and 6 miles below the lake the river cuts through a rock ridge forming the so-called "Little Canyon."

The channel is clear and there is no danger here, however. I estimate the total length of river as 52 miles, although the distance between lakes, disregarding the crookedness of the river, is only 32 miles.

TAHTSA LAKE.

Tahtsa Lake is 19 miles long and 1¾ miles wide at the widest place. It is entirely glacier-fed, its waters emerald-green in colour and very cold, the temperature of the surface water being

Both above photographs were taken from same place—summit of Penteuch Pass, 4,025 feet—upper looking east to Tahtsa Lake; lower, west to Kemano Bay, Gardner Canal.

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only 45° F. in August. The scenery surrounding it is magnificent, especially at the western end, where the craggy peaks of Mount Tahtsa rise above the snow-fields and green ice of the glacier-cap. Rhine Ridge (5,000 to 6,000 feet) lies a mile back from the north shore and continues 7 miles up the lake, terminating opposite the outlet in a huge castellated crag (6,300 feet) capping steep rock-slides. This crag is a conspicuous landmark from far down the Tahtsa River. The little flat land along the lake occurs as deltas built out into the lake by entering torrents, some of which obtain the size of small rivers.

Twelve miles up the lake a low pass leads north-west to Nanika Lake, the distance between lakes being 8 miles. A trap-line blaze from a cabin on the north shore crosses from lake to lake. The mountains south of the lake rise abruptly from a rocky shore, broken through at 8 miles up by a small river heading in glaciers behind Laventie Mountain, a smaller branch of this river rising in a low divide in a through valley crossing to Troitsa (Blue) Lake—a sheet of water 9 miles long—which drains into Tahtsa River 12 miles down the latter.

Laventie Creek, really a small river, comes into Tahtsa Lake from the south, 12 miles down. Forking 8 miles up, its valley is wide and travelling is easy through large alpine meadows. The two forks head some 15 miles back in the range in large receding glaciers, which anciently scooped out the valley.

PASSES TO GARDNER INLET.

We had reason to believe Tahtsa Lake was the "First Lake" referred to in the Canadian Pacific Railway exploration of 1874 from Kemano Bay. Search for the pass over which they ran their line was naturally made at the head of Tahtsa Lake. One route we explored led up the large creek at the lake-head directly up to and across the moraine of a hanging glacier on the north slope of Mount Tahtsa. We reached a summit at 4,260 feet close to a small moraine lake, whose waters, rapidly augmenting in volume, ran south-west in a deep valley. At 7 miles down the creek entered a box canyon, turned abruptly north-west, and joined the Horetzky Branch of the Kemano River. Satisfied this was not the Canadian Pacific Railway Pass, we worked back around Mount Tahtsa to the other creek entering Tahtsa Lake at its south-west corner. Three and a half miles of very rough going brought us to Sandifer Lake, 3 miles long, and at an altitude of 3,250 feet.

At its south end we found a pass (5,000 feet) at the head of an alpine valley which soon turned sharp south and narrowed in, the creek entering a box canyon at an altitude of 3,500 feet. This creek I believe to be a fork of Tsaytis River, which joins Kitlope River near the mouth of the latter.

South of Sandifer Lake, and 3 miles up a glacier-scored trough valley, is a huge glacier which drains three several ways. Facing Sandifer Lake it is a tongue of ice half a mile wide, the face being a rampart of ice cliffs. An accident to one of the party prevented further exploration in this direction.

PENTEUCH PASS.

Later we found an old, very faint trail leading inland from a creek entering Tahtsa Lake on the north side, a mile from the lake-head. The going is easy through alpine meadows. At 1 mile from Tahtsa and at an altitude of 3,100 feet a steep ascent brought us into a basin with a tarn lying against rock slides and cliffs. An easy ascent to an altitude of 3,700 feet, followed by a short scramble up a cataract-bed, led to a small grassy basin and a rough boulder-strewn gap. This is the summit of the pass (4,025 feet) and is 3 miles from Tahtsa Lake.

Two hundred and fifty feet below, to the west, lay Siffleur Lake of the Canadian Pacific Railway report, draining due west. Half a mile beyond we looked down the deep straight valley of the Horetzky (or Penteuchltenay) Creek and could plainly see the flats of Kemano Bay, Gardner Inlet, 18 miles away.

The valley of Horetzky Creek I did not explore in detail; the following excerpt from the report of Chas. Horetzky, who explored it in 1874, will prove of interest. At the junction of the Kemano River with the creek I have named after him he cached his canoes. The altitude here was 190 feet. He writes:—

"The ascent was sharp and, numerous obstacles obstructing our way, we advanced slowly. Three miles above the canoe encampment we came to a heavy snowslide originating from the heights on our left. This avalanche had cleared a passage through heavy green timber, snapping stout spruce-trees off close to the ground, and now not only filled the bed of the stream, but had

actually reached a considerable way up the opposite side of the ravine. As we advanced similar avalanches were passed. . . . Towards the head of the ravine glaciers began to appear. Eleven miles beyond the canoe camp the ground rose very abruptly indeed, and 3 miles farther on the Summit (Siffleur) Lake, situated at an altitude of 3,769 feet, was reached. It will thus be seen that in a distance of 14 miles we had ascended 3,580 feet, an extremely steep rise and quite unavoidable. . . . From this point (the summit) we beheld a scene of surpassing grandeur. Southward, a perfect sea of glaciers obstructed the horizon. . . . Bald rugged mountains, terminating in peaks 3,000 to 4,000 feet above the eye, towered above huge glittering masses of ice held in their vast chasms. A terrible silence, broken only now and again by the dreadful crash of some falling avalanche, reigned over this scene of desolation."

MEANS OF ACCESS AND AGRICULTURAL POSSIBILITIES.

At present Swanson Bay and Butedale Cannery are the nearest points to Kitlope River on the main steamer route. There are no settlements on Gardner Inlet except a cannery and the small Indian village of Kemano.

There is good land on Lower Kitlope River, especially on the Indian reserve, but it would not amount to over a section altogether outside the reserve. The 5-mile strip of bottom along Tezwa River is good land, but would require draining, and it is too inaccessible and far from a market to have a present value.

Along Tahtsa River probably six sections of land fit for agriculture could be obtained, largely willow bottom and meadow. Much of the latter is, however, too rough for cutting, and all would require draining. The timbered areas, both along Tahtsa Lake and the Kitlope Valley, are being reported upon separately for the Forest Branch.

CLIMATE.

The Kitlope Valley has an exceedingly wet climate and the snow in winter lies very deep. The average mean temperatures for June were: Maximum, 55°; minimum, 43°. We experienced also a very cold, wet summer on Tahtsa Lake, the mean maximum temperature in July and August being 67° and the mean minimum 45°. Between July 11th and August 31st rain fell on twelve days. We only experienced two or three really hot days the whole summer, and one blazing-hot day, July 24th, when the temperature at noon was 91° F. The snow is reported to be 12 feet deep on Tahtsa during the winter.

MINING DEVELOPMENT.

There has been no mining development in the region mapped this year, much of it being previously unexplored, and only a little desultory prospecting having been done in the lake area. The prospects on Sibola Mountain, close to the outlet of Tahtsa Lake, were not worked this year.

GAME.

Game was not plentiful. Goat are fairly numerous. Cariboo we saw only back of Kitlope Lake. Beaver were plentiful up Tahtsa River and north of Tahtsa Lake. We saw three bears only up Kitlope River, one on Tahtsa Lake, and were able to get several excellent close-range snapshots of a grizzly swimming Whitesail Lake. Grouse are exceedingly scarce along Tahtsa Lake, although becoming quite plentiful as we neared Ootsa Lake.

All the information obtained is being embodied in a topographical map on a scale of 1 inch to the mile, which will shortly be filed.

I have, etc.,

F. C. SWANNELL, B.C.L.S.

TRIANGULATION CONTROL, BABINE LAKE.

By R. P. Bishop.

Victoria, B.C., January 25th, 1922.

J. E. Umbach, Esq.,
Surveyor-General, Victoria, B.C.

Sir,—I have the honour to report on the triangulation connecting sections of the base already surveyed along the 55th parallel of latitude and extending to cover part of Babine Lake and the adjoining territory.

Before reporting on the technical aspect of the work I will describe the country from a general point of view.

The Lie of the Land.

The country under report may be roughly described as forming the north-western corner of the great Northern Interior Plateau. Hills there are here in abundance and a few mountains, but the latter are lower and not so frequent as in the country immediately to the north and west.

The governing features of this part of the world are the three depressions which contain the Bulkley Valley, Babine Lake, and the Takla-Stuart Lake system. Lying between these are the Babine and Middle River ranges, features which are very pronounced at the northern end of the area, but which break up and die away towards the south. These valleys parallel each other at a bearing of approximately N. 30° W., which is the general direction of so many of the main physical features of the Province. Transverse valleys occur in several places, the more important of these being the portage traversed by the present road between Babine and Stuart Lakes and the valley to the west of Trembleur Lake, through which a road was made in the days of the Manson Creek gold-rush. The latter valley contains the largest block of agricultural land in the country and will be referred to later.

The Sakeniche Valley.

The main longitudinal valleys referred to appear clearly on the map and give an indication of the general lie of the land, but I must admit that I was not prepared to find a similar valley some 70 miles long lying between the Babine and the Takla systems. This valley extends from the Manson Creek Trail to the North Arm of Stuart Lake, and is for the greater part of its length, drained by the two forks of a river called the Sakeniche, which empties into Takla Lake near the Narrows. The two forks unite at Natowite Lake, which is a few miles up-stream from the mouth of the river.

The Sakeniche resembles in a minor sort of way the Peace River, in that its two forks, flowing together from opposite points of the compass, unite and turn at right angles to the general direction, to force a passage through the main axis of the country, the Middle River Range; in the same way that the Peace breaks through the Rocky Mountains immediately below the junction of its branches, the Finlay and the Parsnip.

The North Fork of the Sakeniche, which I have not explored, is said to cross the Manson Creek Trail at "Long Bridge" and to extend through a series of minor lakes to Natowite. I understand that the name of the branch is Hautete, and the largest lake through which it flows is known as Nakinilerak. This apparently lies a little to the east of and parallel to Morrison Lake. I was told by a Babine Indian that he owned canoes on Nakinilerak and could reach them by pack-train from Babine. I had a distant view of Natowite Lake from three triangulation stations, Tsitsutl, Deescius, and Blanchet, and "cut in" an island there by rays from these points. With this exception the lake remains unmapped. There are canoes on Natowite owned by Old Fort Louis, who traps the surrounding country. The lake is reached by a trail from Babine Lake which is said to start not far from the mouth of the Morrison River; there is also a trail up the Sakeniche Valley from Takla Lake which was used a great deal in the past, but I am not certain whether it is of much use now. I was told by the Indians that Natowite Lake, with the trails on either side, formed the chief route between Babine and Takla Lakes before the construction of the Wright Bay Wagon-road.

The Southern Fork of the Sakeniche drains Tochcha (Blue Grouse) Lake, which lies a few miles up-stream from Natowite. Tochcha, which was until this year entirely unmapped, is 12 miles long, straight and narrow, its general direction being that of the main valley. About

6 miles farther down this valley lies Klaytahnkut Lake, which is separated from Tochcha by an almost imperceptible divide and drains in the opposite direction by way of Tyldesley Creek, a considerable body of water almost meriting the title of river. This creek turns to the left a few miles farther on, to flow into Trembleur Lake, but the cleavage continues in the general direction as far as the North Arm of Stuart Lake, which forms part of it. Between Tochcha and Klaytahnkut Lakes there are some very fine meadows, which probably amount to 300 or 400 acres. They are too inaccessible for present use, but may come in handy when the country between Wright Bay and Trembleur Lake is settled up, as they are best reached from that direction.

Having passed from a general description of the country to a more detailed account of this valley, it will be convenient to report next on the surrounding district, working from Tochcha as a centre.

There seems to be a fairly extensive pine-covered flat between Tochcha and Natowite Lakes, but its soil is gravelly and not any good at the southern end, where I made an examination. The northern part of the east shore of Tochcha was burnt over many years ago and has no growth of timber of any size, but there is a certain amount of spruce around other parts of the lake.

East of Tochcha and rising some 2,300 feet above it is Deescius, a bare-topped rocky ridge lying parallel to the lake and commanding an uninterrupted view of its western shore. I was told that the name "Deescius" arose from the number of caribou-horns which were once to be found there, the word "Dee" meaning horn and the suffix "ius" a hill.

East of this ridge is a valley drained by the Gloyazikut (Meadow Creek), which flows in a south-easterly direction until it reaches the end of Deescius, where it makes a sharp bend to the right, passing through the meadows already described to enter the east end of Tochcha Lake by way of the main valley. At the bend it approaches within about a mile of a similar kink in Tyldesley Creek. There are also some meadows in the valley east of Deescius, on the headwaters of the Gloyazikut, but these appear rather too swampy to be of much use. I had not, however, time to examine them thoroughly.

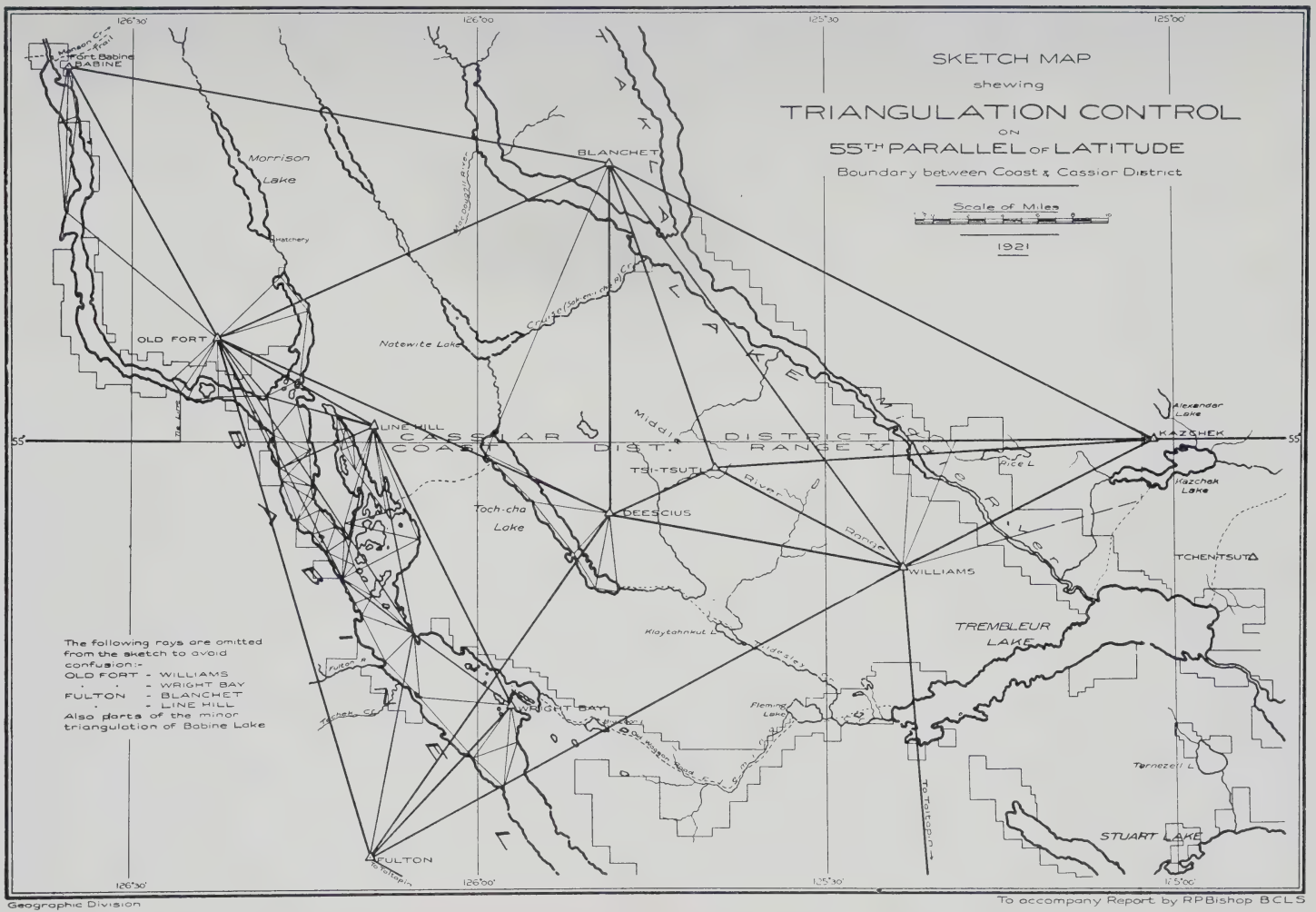
The Middle River Range.

East of this valley lie the foot-hills of the Middle River Range, which are very broken and rugged, and, generally speaking, consist of "hog-backs" running out at right angles to the main system. They seem to be of recent volcanic origin. The main range closely parallels Middle River and is cut in two by a valley just to the south of Pyramid Peak. The northern part is known as Tsitsutl (Stony Mountain) and the southern part as Mount Williams. The latter has an Indian name which I made several attempts to pronounce, without, however, getting quite the right inflection. My instructor in the language warned me that what I really said was something altogether different, and not quite polite, and suggested that if I ever happened to discuss geographical matters in the neighbourhood of his village it would be as well for me to refer to the mountain by its English name. To the lay eye it would appear that the southern (and highest) peak of Mount Williams is a volcano of comparatively recent extinction, as a barren razor-backed ridge of volcanic boulders forms a semicircle about what looks like the remains of a crater. The compass showed 120° of local attraction here. A little to the north we found a quantity of asbestos in a contact between a slaty-looking sort of formation and the volcanic rock. Further traces of asbestos occurred in several other localities. The northern part of the range appears to be mainly of serpentine formation.

Mount Williams commands a wonderful view of nearly all the lakes of the Stuart River system, which are many and various, the largest ones in sight being Takla, Trembleur, Stuart, Inzana, Alexander, Kazchek, Tezzeron, Pinchi, and Tochcha; parts of Babine represent the Skeena watershed and the Nation Lakes, the waters of which flow into the Arctic.

Grazing Areas.

The north-eastern slopes of the range are thickly covered with windfall and difficult to get through, while the southern slopes are more or less open and in many parts covered with luxuriant alpine vegetation. This usually attains its greatest growth in the neighbourhood of the timber-line, where the grass gets a certain amount of shade and where the soil does not wash away so freely. There are parts of the hill, however, where the bare and unproductive soil comes right down to meet the dense bush.


SKETCH MAP
shewing
TRIANGULATION CONTROL
ON
55TH PARALLEL OF LATITUDE
Boundary between Coast & Cassiar District
Scale of Miles
1921
126°30'
126°00'
125°30'
125°00'
55°
Fort Babine
BABINE
Morrison Lake
Hatchery
BLANCHET
OLD FORT
Natowite Lake
LINE HILL
CASSIAR DISTRICT
COAST DIST.
RANGE
TSI-TSUTI
Toch-cha Lake
DEESCIUS
Middle River
Parsnip
Alexander Lake
KAZCHEK
Kazchek Lake
Pice L
WILLIAMS
TCHENITSUTA
TREMBLEUR LAKES
Klaytahnkut L
Ridgeley Cr
Fleming Lake
WRIGHT BAY
Fulton R
Nechako R
Nechako Cr
Pacific Great Eastern Ry
Tetachuck L
Tetachuck R
Tetachuck Cr
Tetachuck Lake
Tetachuck Creek
Tetachuck River
Tetachuck Lake
Tetachuck Creek
Tetachuck River
Tetachuck Lake
Tetachuck Creek
Tetachuck River

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As regards the commercial development of this pasture, I think the land on the northern part of Tsitsutl is too remote and not of sufficiently high quality to be of much practical use. It might perhaps be used some day in conjunction with the lower level meadows between Tochcha and Klaytahnkut Lakes if an easy route for a trail can be found through the broken foot-hill country. As the larder was getting low, we had to travel somewhat hurriedly through this district and devote our time to stalking ground-hog rather than to sizing up the area of grazing land.

To the south on Mount Williams and the adjoining peaks there is a somewhat larger pasture which will probably be grazed some day by cattle from the large block of land which lies to the west of Trembleur Lake. The mountain pasture seems to have an area of between 1 and 2 square miles, which should justify the construction of a trail some day. I had not the opportunity to go into the grazing question thoroughly, so merely indicate regions which it might pay to examine in the future. Other areas worth looking at are Fulton Mountain and a district near the 55th parallel, east of Moricetown, where a large area is referred to by A. Holland, B.C.L.S., in his notes of survey of that line.

A Swede who was working on the 55th parallel in 1920 was of opinion that pastures of this sort would eventually support a cheese-making industry. In his part of the world the families used to camp out for the summer months, following the cows up the mountain-side as the snow melted. On Mount Williams, however, there are a few grizzly which might be disposed to give cattle too hearty a welcome.

TRAIL TO TOCHCHA.

West of Tochcha Lake is a thickly wooded range of hills which attain their highest point near Wright Bay. North of these is a low pass connecting Babine Lake with the north end of Tochcha. This pass is traversed by a trail cut by the "Charlie Pius" family of Indians, who live at the mouth of Fulton River, but claim the Tochcha country as their trapping-ground. As there are two smoke-houses on the lake and several miles of trail around it kept in a very passable state of repair, it must be conceded that they have certain hereditary and vested interests here, although, like most Indians when talking of the size of their "hunt country," they are inclined to lay claim to illimitable country.

At the Babine end of the trail there is a certain amount of good land, bearing a fairly heavy growth of spruce. Close to the lake is a fairly recent burn, now a tangled windfall. The heavy growth of peavine which occurs here shows that the soil has good agricultural possibilities. Bob Charlie has a cabin here and lays claim to some sort of an Indian reserve, although he is not often in residence. The Babine end of Tochcha Trail is very hard to find, and to follow when found, as the first mile or so is through a bad windfall.

OLD FORT.

There is a good deal of land of an excellent quality along the southern shore of the peninsula which lies about 3 miles to the north of the 55th parallel. In the centre of this peninsula lies Old Fort Mountain, a heaven-sent triangulation point, visible from far and near, and with an amazing view of the lake. From Donald's Landing, some 60 miles away, it forms a distinctive landmark, appearing as a perfectly symmetrical cone when viewed from that direction. Nearer approach, without detracting from its beauties, discloses features somewhat unusual in this part of the country, great open patches appearing on the southern slopes and extending almost as far as the top of the hill.

Old Fort village is situated at the tip of the peninsula and from this point Indian farms extend for several miles to the west. The farms are chiefly for hay-cutting and there is not very much done in the way of cultivation. We were, however, able to obtain excellent potatoes, turnips, and carrots here, and also some very good beef on one occasion. The lesser vegetation along the southern slopes of the mountain is amazingly rank in places, fireweed and hemlock growing 7 feet high and making it rather a wet business to climb the hill after a shower. The trees are generally scattered poplar and easily cleared. Higher up the mountain the vegetation grows lower, the soil being not so rich. The upper slopes were apparently once covered with spruce and balsam which were burnt out some fifty years ago.

The country to the south of the lake, especially a little way inland in the neighbourhood of the parallel, forms a marked contrast to all this, being covered with dense brush and littered

with a tangle of windfall which makes progress slow and dangerous. This is presumably chiefly due to the northern slope.

The hills to the east side of the lake, however, as far as Wright Bay, are covered with "Christmas trees" and present quite a different aspect to Old Fort Mountain. Whether the remarkable difference in the vegetation of the latter is entirely due to the quality of the soil, or is partly due to successive burning and grazing, I am unable to say. The matter is extremely interesting from the stock-farming point of view and is well worth investigation by some sort of an expert.

Apparently very little cultivation has been done in the country, with the exception of the few crops raised by the Indians. Mr. McAvoy, who has a pre-emption near Fort Babine, is a firm believer in the agricultural possibilities of his part of the world and has raised some crops on his place, but nothing yet to any great extent. This part of the world is apparently very little affected by summer frost. Towards the other end of the lake, in the Taltapin direction, I believe that Mr. Bowling has an excellent garden.

GAME.

We saw plenty of grouse and fool-hen throughout the year, but not much big game. Deer are scarce, especially near Babine Lake, where the Indian dogs keep them well on the run. Moose are reported plentiful at Wright Bay and in the neighbouring country; we did not go inland here, but saw a few tracks near Klaytahnkut Lake. Caribou are said to have been plentiful on Mount Fulton (Caribou Mountain) up to the time of the construction of the Grand Trunk Pacific and horns are still to be found on the mountain in large numbers. The Indians say that these beasts formed part of a larger herd, which is now confined to the south of the railway. I should think they extend for some distance along the foot-hills of the Coast Range, as we found a good many while running out the 53rd parallel in 1912 and 1913. Caribou were once to be found on Deescius and on the Middle River Range, but have been extinct there for many years. There are, however, said to be a few on the Frypan Mountain, to the north of the Manson Creek Trail. We saw no signs of mountain-goat during the whole season; there are apparently none in the country, but the Indians say that they occur in the hills to the north and west. Above timber-line on the grassy southern slopes we saw plenty of ground-hog (hoary marmot) and more frequently heard the shrill whistle which they emit by way of warning their friends of the approach of an invader. These little beasts are exceedingly good to eat, but by no means easy to hit. The skins make excellent robes. There are some black bear and a few grizzly here; we saw tracks of the latter in August on the Middle River Range, especially near the runs of the ground-hog, whose flesh they much appreciate.

FUR-BEARING ANIMALS.

Marten, mink, fisher, ermine, fox, beaver, musk-rat, and bear are the chief of these. Trapping is an extensive business here and affords a good living to many hundreds of Indians and a few white men. A detailed account might be out of place in this report. In the spring Mr. Anderson had a few mink and some marten which he intended to breed for fur. I believe that some of these have been taken over by J. Wiggins, who has a place on the north shore of the lake, a few miles from the eastern end.

FISH.

Babine Lake is on the Skeena watershed, where the salmon have not been exterminated as is practically the case on Stuart Lake. Salmon still form the staple diet of the Babine Indians, who put up large numbers of dried fish for the winter. They originally had a weir where the Babine River flows out of the lake, but now have to use nets, as the weir has been destroyed in order to allow fish to come up for spawning. There is a Dominion Government hatchery on Morrison Lake, which latter drains into the Fraser River. Other fish are trout, char, land-locked salmon, and whitefish; the trout and char readily take a spoon, but the others have to be netted. Some of the char we caught measured 36 inches. I think there are no sturgeon here, although these are caught over the divide in Stuart Lake.

INDIANS.

There is a large Indian population around Babine Lake, semi-migratory and, one might almost add, amphibious, as movement is generally up and down the main lake or one of the

lesser waterways. Babine, the largest village, is at the north end of the lake, where the Babine River flows out of it. The Indian part of the village boasts of two churches, one new and the other falling into decay, and two stores, which are, however, closed when the Indian population is away from town. The white population there is represented by the Hudson's Bay Company officials and their families, the schoolmaster, and at times, the various fishery officials.

Another village is at "Old Fort," on the tip of the peninsula just to the north of the 55th parallel. A good many houses are scattered along the lake in this vicinity, mainly for the first 6 miles to the west of the village, on the southern slopes of Old Fort Mountain. There are also some houses at Tachek, at the mouth of Fulton River, and at Donald's Landing, the end of the Burns Lake Road.

Reference to "The History of the Northern Interior of British Columbia," by the Rev. A. G. Morice, O.M.I., shows that Babine Lake was first visited by the North-west Company in 1812, and the first post, Fort Kilmars, established at "Old Fort" in 1822, the year after the amalgamation of the company with that of the Hudson's Bay. This post was supplied from Fort St. James, the headquarters of the district. After a few years it was found that trade on the lake was badly affected by competition from the Coast Indians, who bought goods from ships on the Pacific and brought them up the Skeena to trade at Hazelton. The fort was accordingly moved to the north end of the lake in 1836 to offset this new competition.

The habit of independent trading and of quickly taking advantage of new and advantageous trade routes is still very noticeable among the Babines, some of whom are very successful storekeepers. Communication with the Coast has had its effect on the taste of the inhabitants, as various products of the "saltchuk," such as oolachan-grease, dried seaweed, and fish-roe, find a ready market at Babine. The Stuart Lake Indians, on the contrary, have no taste for oolachan-grease and could not be induced to buy any when the Hudson's Bay Company at Fort St. James imported a consignment of it. I suppose the prehistoric grease trade did not extend in this direction, and, as the liking for this delicacy is what epicures call an "acquired taste," perhaps the Stuart Lake people have not yet had time to pick it up; personally, I never got beyond the smell. The seaweed I saw at Babine looked something like the laver eaten in Devonshire with hot roast mutton.

About July 1st the world, his wife and his dogs, from all parts of the lake, go to Babine to get away from the mosquitoes and have a good time generally. There may be some other reason for this meeting of the clans, but I was not able to discover it.

I cannot say that the dogs always have much cause for rejoicing at this time of the year; their time comes later when the salmon run is on. They were, however, doing very well when we arrived, as a horse had very thoughtfully died close to the landing-place a few hours beforehand. The next morning only a few bones remained. The Stuart Lake Indians had told me the year before of the great numbers of dogs to be found here, and I found that the picture was by no means overdrawn. Those beasts have a poor time of it in the winter, to judge by their condition and appetite in the spring, and for this reason one cannot leave one's tent for a moment when camped near the village. They are easily scared away in the spring, but an Indian told me that later on, when well fed after a good salmon run, they get "too high-toned" and, I suppose, a bit abrupt in their manner.

It is easy enough to go to Babine about July 1st, but a very different matter to get away from the village for the next week or two if one is at all dependent on Indians for transport, as nobody wants to miss the festivities by taking a job which might lead out of town. The census official was particularly unfortunate in his efforts to obtain a motor-boat this year, and eventually had to make his trip down the lake and back (about 200 miles) in a rowboat. The more experienced prophets foretold for us a stay of at least a week, so we considered ourselves lucky in being able to outfit, hire a pack-train, and leave for Takla Lake within a couple of days. When we got back about the end of the month everybody was leaving to cut hay, and in a few days the village was practically deserted. After the hay season the salmon run has to be attended to, when the year's supply of fish has to be caught, cleaned, and smoked.

Preparations for trapping commence about the end of September, and I understand that the next break is at Christmas, when everybody lays off for a week or two in order that the season may be kept with appropriate observances. On special occasions, however, everybody will flock back to town. We were camped opposite "Old Fort" in October when a funeral took place; mourners came from far and near and the village was once more inhabited for a few

days. It was a fortunate occurrence for us, as an ox had to be killed to provide for this influx, and we were, in consequence, able to purchase some beef.

A number of the Bear Lake Indians usually turn up at Babine for the July celebrations or whenever the priest is expected. These Indians are partly of Sicanni descent, and, like the Sicanni, lead a very nomadic life, hunting north as far as Thutade Lake and the headwaters of the Stikine, and sometimes staying away for over a year at a time. The Babines, on the contrary, though always on the move, seldom go very far afield for trapping or hunting.

This year the Bear Lakes were late in turning up at Babine. I had a Bear Lake Indian with me for some weeks and found him extremely useful in triangulation-work, as he could invariably describe to me beforehand the views to be obtained from any hill which I proposed to use as a station, thus saving me from making several abortive trips.

The Babines are extremely adaptable and quickly pick up any new idea. Many of them are masters of the art of Evinruding and seldom get stuck with a motor. They are wonderfully conversant with its working principles and also with the various dodges for dealing with a sulky engine. As fitters they are perhaps inclined to be a little too hearty with the use of the file; one non-mechanical gentleman put this fairly well when he said: "Jimmy's engine not much good now; too much fix 'em all the time." Many of them own engines but are always out of gasolene, which they have no hesitation in trying to borrow. The Babines clearly feel conscious of an Indian national spirit, but at the same time are loyal subjects as far as their ideas go. I am told that only men of a certain standing are allowed to fly a Union Jack at the bow of their boats, in the same way that only an Admiral of the Fleet is allowed to fly this flag at the fore; but I cannot vouch for this. Two of them who were on a side-trip with me were deeply interested in the system of government of the Empire; not so much in the elective part of the business as in the relationship of the King to the Governors-General and the Lieutenant-Governors. After I had explained this to the best of my ability he wanted to know the names of our Kings for some time back. My reply seemed to puzzle him, for he then said: "I think more than one King stop some place; one time So-and-so tell me he go Ottawa see King Laurier"!

All the Carrier Indians are very nervous about meeting any kind of strangers when travelling in the woods and often conjure up the spectacle of a "bad man" lurking behind a tree. The bogy is generally supposed to be a Cree, who is looked upon in very much the same sort of way as a "Stik" or fresh-water Indian is regarded by his cousins of the Coast. Any sort of stranger is "bad" to the Carrier, but the Cree is especially to be feared for his indiscriminate use of love philtres, of which he is said to possess some terribly powerful brands.

Resources, Communications, and Development.

These subjects should be discussed at the same time, as the successful development of the resources of any country depends entirely on the existence of a cheap and reliable system of transportation.

In the past this country has mainly depended on the fur trade or on the placer-mining carried on in the neighbouring territory of Manson Creek, so that lines of communication have been planned with a view to the development of one or other of these industries.

The present stage is plainly transitional, following on the completion of the Grand Trunk Pacific Railway and the construction of a partly completed road connecting Babine Lake with the steel at Burns Lake.

This road was designed, presumably with a view to agricultural development, by a land company hailing from Spokane, which was interested in certain lands along the shore of Babine Lake. The development did not follow, and the company was unable to complete the payment of wages for road-work, which were consequently settled up by the Government.

The road was well worth the money expended, as a good deal of traffic has gone over it, but the Public Works Department is in no way responsible for the construction of the road, which is badly located in places and not built around Pinkut Lake.

Before dealing with the question of the future development of the country, I will describe what has taken place up to the present, as certain natural features made use of in the past will play an important part in the lines of communication of the future.

I have referred to the establishment of the Hudson's Bay Company's post at "Old Fort," and later on at Babine, as offshoots to the headquarters at Fort St. James. Later on, when supplies came up the Skeena and over the trail to Babine, this state of affairs was reversed and

Fort St. James supplied from the west by way of Babine and Stuart Lakes, large scows being used on these waterways, which were connected by a wagon-road at "The Portage." This route supplied the greater part of the Northern Interior prior to the construction of the Grand Trunk Pacific Railway.

I remember while working in the Nechako Valley in 1907 we found supplies especially hard to procure when one of the Hudson's Bay Company's steamers sank on the Skeena, thereby causing a shortage at the Fraser Lake post, which was then largely supplied by way of Stuart Lake. With the completion of the Grand Trunk Pacific, Fort St. James drew its supplies from Vanderhoof and the scows on the lakes went out of business. The wagon-road at the Portage is still, I believe, in good condition.

The rush to the Manson Creek diggings in 1869 and the following years brought an influx of miners up the Skeena to Hazelton and on to Fort Babine, whence supplies were ferried up the lake to Wright Bay and hauled by wagon to Trembleur Lake over a road built for the purpose.

The connection with the Manson Creek Trail at the Old Landing on Takla Lake was made by the steamer "Venture," whose remains are still visible on the west shore of Trembleur Lake. The valley through which the old road passed contains a belt of land which is generally reported to be of exceptional value, so it is likely that a portion of the old road will be used again at some future date.

The Wright Bay route was eventually superseded by a trail cut direct from Babine to Takla Lake by way of Frypan Creek. The easterly part of this is now disused and the present trail goes south of the Frypan Mountain to Takla Landing, where passage over the lake can be made by a scow. The Manson Creek diggings are practically a thing of the past, and what little traffic there is usually goes by way of Fort St. James, so that the trail beyond Takla Lake is not very much used. The western part is travelled over more frequently, especially by the Bear Lake Indians on their periodical trips to Babine.

The Hudson's Bay Company continues to draw supplies from Hazelton by pack-train to this day, and we were fortunate enough to see the good old-fashioned spectacle of eighty horses unloading at Babine on the day of our arrival there.

The Hazelton Trail is, however, being supplied by the Burns Lake Road already referred to, although the latter is incomplete and suffers from the disadvantage of being cut in two by Pinkut Lake. Rates from the Grand Trunk Pacific to Babine Lake are 5 cents per pound by way of the pack-trail and 2 cents by way of the road, so that the Burns Lake route is cheaper even when supplies have to be shipped right up to Fort Babine, at the north end of the lake, despite the intervening 74 miles of water.

Transport up the main lake is by sleigh in winter or by small flat-bottomed bateaux propelled by outboard motors during the summer. The extremely strong winds which blow here at times make the trip a somewhat uncertain sort of business with these boats, but should not hinder the craft of larger size which will undoubtedly be used here at some time.

I believe that freighting on the ice generally takes place during the latter part of the winter, as at first the ice tends to get flooded in places when pressed down by the weight of fallen snow.

As active competition for the Indian trade has developed at Burns Lake, traffic by this road has greatly increased. It would undoubtedly be the only freight route to Babine were it not for the fact that the road has not yet been built around Pinkut Lake. This break in continuity, and the consequent confusion arising from ferrying freight down the lake and reloading into a fresh wagon at the other end, makes things very awkward during the summer months for people who live at a distance. Further complications ensue when Pinkut commences to freeze and becomes impassable for a few days until the ice is strong enough for a team. The Burns Lake way is, however, the favourite route to Babine Lake, despite all these difficulties, and will be still more so when they are overcome.

Travellers who may be going into the Babine country in the near future will be interested to learn that teamsters may be hired at Burns Lake who will see them safely through to Babine, and that the date at which the road is passable and the lake navigable varies with the seasons, but is rarely later than May 15th. At the fork of the road just before Pinkut Lake there is a cabin containing a store and other accessories, which the Taltapin Mining Company has kindly placed at the disposal of the public. Although the road is not built along the side of Pinkut Lake, there is a pack-trail for horses on the western shore.

There are a couple of boats on the lake, and on one of these Mr. Aslin, of Burns Lake, had a motor during the summer. This year there was on the far section of the road a wagon which was, I believe, in full commission for a few weeks; at other times horses have to be walked by trail around the lake. If the teamster forgets the swingle-trees there is a certain amount of delay at the far end. It is as well to have a man with the team who knows the ropes; this year Brunel, McPhail & McDonnell were specializing on this route. At Donald's Landing, the end of the road, are the boat-houses of the Provincial Forestry Department and Dominion Fisheries Department, which can be distinguished by the signboards "P.F. Department" and "Canadian Naval Service" respectively.

Jimmy Donald, an Indian who does a good deal of freighting on the lake, has several boats here and is often available for hire. The boat question is, however, rather an uncertain one at this point.

Emile Williams, a Babine Indian, has just started a store here; he does freighting and has several horses and one or two boats. He is generally supposed to have a pretty good head for business and has certainly shown good judgment in choosing this location.

Future Development.

In considering the question of future development, we must remember that the simple means of communication which have in the past sufficed for the prosecution of the fur trade and for the needs of a population which has up to the present consisted almost entirely of Indians will not adequately provide for the future. A more elaborate and carefully thought-out means of transportation will be required if the mineral, land, and forestry resources are to be fully developed on an economically sound basis. Such a basis can only be obtained by avoiding the waste of effort which inevitably occurs when the various resources of the country, their development, and the several links in the chain of communication which supports such development are considered as separate problems and not as different aspects of the same problem. In other words, we must, before opening up a country, take into consideration the value of its natural resources in order to forecast the direction and extent of the lines of communication which their development should ultimately justify. Under the heading of "The Lie of the Land" I have referred to the three main longitudinal valleys, the main physical characteristics here. Along the westernmost of these is the Grand Trunk Pacific Railway, the datum to which we must refer the whole question of transport throughout this district. Each of the other valleys contains great waterways, Babine Lake and the Takla-Stuart system, navigable during the summer and used as sleigh routes in the winter. Through both the transverse valleys connecting these lakes have at one time run wagon-roads, each of which has formed part of a main transportation route in conjunction with Babine Lake and the system to its east. If the railway is connected with Babine Lake it is consequently connected with the whole system, and such connection would therefore open up a large tract of territory with comparatively little expense.

We have now to consider the question of the most suitable route along which such connection should be made. The Hazelton route is suitable for a pack-trail only. There are other locations between this and the existing road, one being between Fulton River and Topley or Perow. The Burns Lake route is probably the shortest, and although the present road is purely a makeshift, it seems likely that the same general location can be followed later on by a better road, or possibly a light railway. Furthermore, Burns Lake is a distributing centre to the Ootsa Lake and Francois Lake countries and is already a rapidly growing little town. It seems, therefore, to be the logical point of departure for the Babine territory.

The next step is then to determine the value of the Babine resources in order that we may see what kind of transportation along this route their development will justify.

Sufficient information has not yet been acquired to enable a final decision to be reached at present. I will, however, indicate lines on which inquiry should be made before any further work is done on this route beyond keeping the present road in repair.

The chief resources as yet undeveloped are mineral, land, and timber. The chief mineral-deposits are Mr. Newman's claims on the 55th parallel (1913), Mr. MacDonald's on Copper Island (1913), Mr. Hagan's on Silver Island (1913), and Mr. Anderson's near Taltapin Lake (1920). These properties have been examined by mining engineers who have allowed their reports to be printed in the Department of Mines Report for the years noted. I believe that the properties have not been examined in detail by officials of the Department.

There are also other deposits, away from the lake, on the east side of the Babine Range, which affects the general situation. J. D. Galloway, Assistant Mineralogist, deals with the question of access to these in very clear language in his general report on the district printed in the Mines Department Report for 1914.

He says: "In order to open up the Babine Lake country there will probably be a road put in from the railway, starting either at Fraser or Burns Lake. When this is done the properties on the Babine Range, which lie on the slope towards Babine Lake, will find that their best method of transporting ore."

A good deal of development-work has been done on the Babine Lake claims in recent years, so that their value can be now more clearly determined.

It is clear that in order to gauge the type of transport which the traffic will ultimately justify a complete report will be necessary on the combined value of these deposits, both on the Babine Range and on the lake.

There is not much large timber on Babine, but a certain amount of spruce of fair size occurs in scattered patches. I saw no fir on the northern end of the lake, although on Takla Lake a few specimens occur as far north as 55° 16′. Taken as a whole, the country around Babine Lake has been remarkably little burnt over in comparison with the Middle River District, so that balsam, spruce, pine, and poplar of moderate size are common.

In view of the success of recent experiments as to the value of jack-pine for pulp-making, the rapid growth of this industry, and the great length of the shore-line of Babine Lake, which is navigable everywhere, it seems possible that the industry, if it continues to develop at its present rate, might be established here eventually, but not, of course, for some time. I understand that the falls on Fulton River are capable of developing a considerable amount of power which should be useful for this purpose.

I have referred to the open country near "Old Fort." This is largely occupied by Indian reserves, but to what extent I cannot say as I have not been over the lines. Some good and also some indifferent land has also been surveyed at different times along the lake-shore by private individuals, and there are still some places where a few more lots might be run out. Altogether, the surveyed land around the northern shores is too scattered for present use, but will probably settle up by degrees as transportation develops along the lake.

West of Trembleur Lake, however, we have a large block of agricultural land through which the wagon-road ran in the early days of the gold-rush. The surveys here are extensive and some of the land is excellent, but whether the whole block is of high quality cannot be said until a careful cruise of it has been made. The centre of the block is about 12 miles to the north of Donald's Landing, and from this centre a valley, which suggests from the lake a good route for a road, runs in a southerly direction to a point on the shore which might be suitable for a crossing, as the lake is fairly narrow there. Hitherto the lake has been considered as a help to transportation; here it becomes an obstacle between this tract of land and the railway. The road from the south should accordingly be planned so as to reach the shore at a point where there will be good ice for crossing during the winter, as well as harbour facilities during the summer.

The question of transportation may be affected by a further matter of which I have, however, no first-hand knowledge. Mr. Newman has located some licences on Fulton River, where he says that there is a very considerable body of coal. Judging from the appearance of the country, this should be easily accessible from the lake as from the railway near Topley. If the quantity is large enough it might justify the building of a spur, which could perhaps be carried on to reach Babine Lake near the mouth of Fulton River. This part of the lake, however, is very broad and liable to violent squalls, so that it would not be a suitable crossing for people living on the block of land I have already referred to.

Survey.

The chainage of the portion of the parallel between Kazchek Mountain and Middle River (Miles 42 to 55) was used as a base and the position of a station on Mount Williams cut in from several points on this line. An approximate check on the value of the line Kazchek-Williams was obtained by triangulation from another point on line north of Inzana Lake. Expansion to Mount Blanchet was obtained by means of "Tsitsutl," a point on the Middle River Range near the parallel, and connection with Babine Lake followed by the quadrilateral Blanchet-Williams-Fulton-Old Fort.

The diagonals of this quadrilateral were observed, but, as they were about 42 miles in length, were too long to make sure of observation during the hazy weather. Accordingly, a central point, Deescius, was selected to map Tochcha Lake, the entire southern shore of which was visible from the triangulation station. Outlying points were fixed at Fort Babine and Taltapin Mountain, the latter being tied to by V. Schjelderup during his triangulation of Taltapin Lake. The point on Fulton was connected with the Bulkley Valley surveys by means of a subsidiary base measured on a tangent of the railway between Topley and Perow.

The greater portion of the Babine Lake triangulation was controlled by the side Fulton-Old Fort of the figure referred to above, this line being broken down by a series of minor quadrilaterals. The detail work on the lake was somewhat intricate and took a certain amount of scheming. Virgil's "Insula est in arcessu longo" describes this part of the world very well, for wherever a deep retiring bay occurs on Babine its mouth is sure to be blocked by an island so thickly clothed in bush as to frustrate the surveyor's efforts. Fortunately a few high bare-topped hills were close enough to the lake to control the lesser work and at the same time break down the main figures.

The angles were observed with 5-inch Berger transit theodolites reading to 30 seconds. The verniers were read by means of a double lens which permitted interpolation to 10 seconds. Minor stations were cut in by rounds of angles taken with both faces, the results being very satisfactory and justifying the maker's claim that no discrepancy can be detected between A and B verniers of the instruments.

In observing at main stations I used the method of repetition in preference to that of direction, although the latter is generally employed in modern practice. In the former method each angle is multiplied four, eight, or twelve times, according to the degree of accuracy required, and the resulting angle read from the instrument divided and by the number of repetitions. When possible the horizon is "closed" by summing the angles and apportioning among them excess or defects over 300°.

In the direction system a complete round of angles on all stations is taken with the theodolite set in a certain position. The instrument is then set on a fresh zero and a fresh round taken, the process being repeated a number of times and a mean of the results taken.

This latter system is generally employed in modern practice and is very satisfactory where one has micrometer instruments which read to a second or two, and where uninterrupted observation may be had of the distant points. In geodetic work this latter condition is usually obtained by lights at night wherever the rays are too long for easy observation by daylight. Night observation is, however, out of the question on work of this sort. Furthermore, by day the haziness produced during the hot weather and the continually changing character of the light at all times seldom allows clear views of all the objects at the same time, so that the direction method is not convenient as far as observation conditions are concerned.

Again, micrometer instruments, although giving very close readings, are extremely delicate and too heavy for work in the Northern Interior, where help is expensive and dense bush makes travelling a slow business.

This year when travelling to remote points we left behind the tripod and mahogany box and carried the instrument in a gasolene-tin, well wadded up with spare clothes, beans, Quaker oats, and other suitable articles. The tin was wrapped in blankets and carried by means of a pack-saddle, pack-straps, or a pair of old overalls. The other man carried the cook-pots, fly, and some more food and blankets, so that two of us could easily last out for three or four weeks, given decent weather. This mobility would have been impossible with micrometer instruments.

When observations were being taken without the tripod the theodolite was mounted on the board, which is designed to secure it in place in its box. On the hill-tops we were able to get on very well, as a suitable lump of rock could usually be found to take the place of the tripod. Given a solid enough rock, the horizon closures were as satisfactory as those obtained when the instrument was set up in the orthodox manner.

It is evident that weather conditions and the difficulties of transporting instruments suitable for the direction system combined to make the repetition method of observing angles more suited to local conditions.

As the results obtained by these two systems require to be adjusted by different methods, I am balancing the larger figures by the method of angles in accordance with the principles laid down in "Adjustment of Observations," by Wright & Hayford. The method which is usually

described in more recent text-books is better suited to angles observed by the "direction" system. These adjustments do not apply to simple triangles, but only to figures where certain geometrical conditions have to be satisfied. In the work under report I avoided a complicated network as far as possible and endeavoured to secure either quadrilaterals with open diagonals or closed polygons with an internal point. Good examples of the adjustment of these figures by the method of least squares are given on page 233 *et seq.* of "Adjustment of Observations." These figures afford excellent checks on the work, especially where any angles have been missed, and give far better results than simple triangles, with very little extra labour.

On lake-shore work, however, the tripod was very necessary to raise the instrument to a height sufficient to clear the curvature of the earth's surface. On Babine Lake, where some of the stations were several miles apart, the effect of curvature was especially marked, so that a white flag had to be placed above beacons built on the water-level whenever they were separated by a distance great enough to make our standard-pattern whitewashed beacons disappear hull down beneath the horizon.

A number of the stations on the lake-shore were marked by the standard-pattern iron post provided by the Department. Where suitable work occurred a hole was drilled and the post driven into it. The shore-line was sketched between stations, occasionally with the help of intermediate points, and a certain amount of stadia-work done. The coast-lining was rather hurried, as we were anxious to obtain enough information to make a map of the northern part of the lake, on the scale of 1 mile to the inch, before the freeze-up. This object was attained, together with the connection between the sections of the base and ties to all surveys in the neighbourhood.

In conclusion, I wish to express my thanks to H. MacDonald and Mr. and Mrs. Pendleton for the use of their cabins on the lake which we used as headquarters for the summer, and to acknowledge the assistance given by the officials of the Forestry and Fishery Departments and the Hudson's Bay Company.

I have, etc.,
R. P. Bishop, B.C.L.S.

TIMOTHY MOUNTAIN LAKE, LILLOOET DISTRICT, AND MAHOOD LAKE, KAMLOOPS DISTRICT.

By W. S. Drewry.

Victoria, B.C., February 8th, 1922.

J. E. Umbach, Esq.,
Surveyor-General, Victoria, B.C.

Sir,—Under your instructions, I left Lac la Hache to place a party in the field to subdivide lands east of that point adjoining Timothy Mountain Lake. A camp was established at Greeny Lake, about 7 miles from Lac la Hache, on the road to Timothy Mountain Lake, which will hereafter be referred to as Timothy Lake.

The field-work was put under charge of Major D. M. Mackay, O.B.E., and commenced by connecting the surveys in Township 30 with isolated surveys near the west end of Timothy Lake; following which traverses of Greeny Lake and the north shore of Timothy Lake were made, so that the subdivisions of lands could be planned to the best advantage.

Character of Lands.

The lands in that vicinity are for the greater part open poplar-flats or slightly rolling country, with black loam soil having a clay subsoil. Some stony, fir-clad ridges lie about Greeny Lake; but these are narrow, falling off to the north into flats along Timothy Mountain Creek, and descending south slightly to a plateau extending east on the southerly side of a ridge along the south shore of Timothy Lake. This plateau falls to the south into the valley of 111-Mile Creek, draining eventually into Lac la Hache.

North of Timothy Lake the slopes of Little Timothy Mountain come to the water very gradually, the lower portion being clad with quite open poplar and pine forest, throughout which is found luxuriant vegetation, embracing various grasses, peavine, lupine, and other nutritious fodder-plants.

On the south side of the lake the northerly slopes are quite steep in places, but considerable of the area might be brought under cultivation. The forest-cover is mostly small poplar, with black loam soil carrying a rank growth of grasses and other plants, caused probably by sub-irrigation, breaking out as springs near the shore.

It is probable that this land, if cleared, would make excellent hay land; but it was not subdivided, as it was considered advisable to use available funds for the survey of level lands which would probably be brought into use first.

All this portion of the country, including Lac la Hache Valley, may be classified as primarily a grazing and dairying country, but grains of various kinds are grown, as well as good garden produce.

Timothy Mountain Lake.

Throughout the whole area mentioned above the securing of winter fodder is of prime importance, and the natural meadows are not of sufficient extent to permit full development of the country. The existence of this lake-basin, which could be utilized for storage, lying some 250 to 300 feet above the valleys in question, would therefore appear to be of paramount importance, since water stored there could be brought on the benches above the bottom lands, thereby greatly increasing the area on which fodder for winter use might be grown, as well as improving much of the open range.

The outline of Timothy Mountain Lake was determined by chain traverse along the north shore and triangulation to points on the south shore. The easterly end of the lake was also triangulated and the shore-line sketched in down to the narrow neck leading to what is shown on the map as Dempsey Lake, but which is really a portion of Timothy Lake, the division being a low beaver-dam across the neck. The outlet is a creek flowing through a meadow for about half a mile and then falling rapidly into 111-Mile Creek at Chub Lake.

Accessibility.

The area surveyed in that section is 6,234 acres and may be reached from Lac la Hache by the road to Timothy Lake, whence a rough road has been cut southerly some 2 miles to a meadow lying east of Lot 3650. From this point a road was cut easterly some 3 miles to Lot 4989, connecting with a road from that point to the Spring Lake Road in 111-Mile Valley. The survey camp was moved over this route by wagon, eventually reaching 111-Mile House by the Cariboo Road, within about 2 miles of which the Horsefly Road was crossed. This latter road, commencing at 108-Mile House, extends northerly to Harpers Camp and the Horsefly country, but between 108- and 111-Mile Houses is not passable for wagons owing to some of the bridges having been burned. In addition to the road, several trails traverse the area, the main trail from Canim Lake to Lac la Hache passing south of the lake, while a branch goes around the west and northerly sides of the lake, being utilized by Indians both from Canim Lake and Chilcotin, who visit this section to gather blueberries and hunt. The branch trail was extended around the east end of the lake for survey purposes, so that a complete circuit of the lake may now be made with horses.

Game.

Deer and moose appeared to be fairly numerous on the slopes of Little Timothy Mountain and the rough country east of the lake.

Black bear appear to be plentiful throughout the area, probably being attracted by the luxuriant crops of blueberries and saskatoon-berries, for which the region is noted.

Timothy Lake is famed locally as a fishing-place and affords fine sport with a fly-rod, the fish being rainbow trout from 1 to 2 lb. in weight.

Canim and Mahood Lake Surveys.

Having initiated the survey of lands at Timothy Lake, a small second party in charge of J. H. Drewry, B.Sc., was placed in the field at Canim and Mahood Lakes to survey lands under application, and a tie from the Lillooet-Kamloops boundary, surveyed in 1913, to surveys in the Clearwater Valley whose position on the map was somewhat doubtful.

A tie-line about 1½ miles long, also run in 1913, from the district boundary mentioned above to Mahood Lake was utilized. It having been decided to survey Mahood Lake by triangu-

lation, the use of a boat was secured from B. H. McNeil, of Canim Lake, and a light raft of cedar constructed which it was found could be rowed about 3 miles per hour on smooth water.

The lake survey was commenced by measuring a short base some 22 chains in length along the shore at the westerly end of the lake, eight measurements of the base being made and the mean taken as true length. From this base a triangulation was expanded easterly, using a quadrilateral system with diagonals observed as control in adjusting angular measurements made with a 6-inch "Berger" transit cut to 20 inches. Each angle of the triangulation was read eight times, so that very small corrections were necessary at any station to conform with the quadrilateral adjustment. Side equations were not taken into account, as it was considered that the instrument used did not warrant expenditure of time which would be required to make such adjustment.

A cedar post referenced by bearing trees was placed at each station, being sometimes planted firmly in the ground, but frequently placed in a substantial cairn used as an instrument-platform when observing. These posts are 4 or more inches square and marked L.T.A., with the station number following, even numbers being on the south shore and odd numbers on the north side.

A short signal-mast, generally a small cedar or poplar peeled, was stepped in a 1-inch hole bored in the top of the post, and was held in a vertical position by three braces nailed to the mast. When observing at any station the masted was lifted out of the post and replaced when observations were completed. Small flags fastened to the masts were found to identify them sufficiently.

The triangulation net covering Mahood Lake extends some 12¼ miles in an easterly direction and has an extreme breadth of about 1½ miles, most of the stations being slightly above high-water mark, but station 20 on the south side of the lake is 280 feet above the water on a rock bluff rising sheer from the water.

The final side, some 33 chains long, at the easterly end of the lake, was measured carefully with the tape, and the difference between measured and computed lengths was found to be about half a link. The initial base was measured in July, while the final side or check-base was measured in September, the difference in temperature of the periods being probably at least 20° F. Using the expansion coefficient 0.0000065 for steel tapes, this temperature difference would account for the one-half link discrepancy in computed and measured lengths of the check-base. This very close agreement is no doubt due to an accidental balancing of the small errors of survey, but serves to show that the work was carefully done.

CONNECTION TO CLEARWATER VALLEY SURVEYS.

From the last triangulation station a traverse was run north-easterly to the north-west corner of Lot 3475 on the east bank of the Clearwater, about 1¼ miles below the mouth of Murtle River, and northerly along the west bank of the Clearwater to the south-east corner of Lot 2692. The Clearwater at this point flows through a canyon some 300 or more feet in depth.

Where crossed the stream was some 5 chains wide, apparently about 30 feet in depth, with a flow of about 5 miles per hour. The volume of water from Murtle River seemed greater than that in the Clearwater above their junction. The timber seen in this neighbourhood seemed to have more possible value as pulp-wood than saw-timber. The lands observed are unsuitable to agriculture, being rough and stony.

GENERAL DESCRIPTION.

Canim Lake is a fine body of water some 20 miles long, with an extreme breadth of about 3 miles, lying 27 miles north-easterly from 100-Mile House on the Cariboo Road, from which point it is accessible by motor-road. This lake is bounded in part by high wooded mountains, but about the mouths of creeks and the easterly end there is considerable agricultural land; B. H. McNeil's fine farm at Jim Creek, with considerably over 200 acres under cultivation, proving the possibilities in this direction.

The outlet is Bridge Creek, which at about 1½ miles from the lake drops perpendicularly some 85 feet, and then falls in a succession of cascades, pools, and swift riffles about 300 feet in about 2½ miles, whence it flows with rapid current about a mile into Mahood Lake near its west end. Incidentally it may be mentioned that this stretch of broken water affords probably some of the best stream-fishing to be found, the trout being of large size and extremely lively.

The valley is from 1 to 2 miles wide, some of the land being suited to agriculture, while part of it is stony.

There is no agricultural land about Mahood Lake, excepting a few hundred acres at its west end.

Evidently the mountain-slopes have at one period been covered with a forest of large fir, cedar, and spruce, which was destroyed by fire. This forest is now being reproduced, but the timber is as yet too small for the saw, most of it being fit only for pulp purposes.

The rock-exposures are mica-schist until Candle Creek is reached, flowing in from the north about 8 miles down the lake. Here an escarpment of lava some 300 feet high shows for about half a mile. This lava escarpment again shows about the easterly end of the lake-basin, which has some resemblance to a shallow crater-bowl.

Bridge Creek flows out of the lake at its extreme easterly limit, falling about 6 feet in the first 100 feet of its course. The stream is extremely rough, dropping some 300 feet in about 2½ miles to the Clearwater River. A very considerable water-power might be developed here, with Mahood, Canim, Horse, and Bridge Lakes as storage-reservoirs.

Mahood Lake is a particularly beautiful sheet of water, the mountains on either side rising abruptly from the shores, showing cliffs and rock-slides in places. The mountain-slopes are clad in a soft mantle of green, broken here and there by rock bluffs, while the tops show rugged and bare some 3,000 to 4,000 feet above, with an occasional patch of snow until late summer. The vistas and colouring are lovely, especially toward the eastern end, where snow-capped mountains beyond the North Thompson River are visible above the lava-rim of that portion of the lake.

POSSIBLE DEVELOPMENT.

Canim and Mahood Lakes seem to possess the elements for development of a great resort, having beautiful natural surroundings about 2,000 feet above sea, magnificent fishing and boating, bathing-beaches, mountain-climbing possibilities, and good fall hunting-ground.

Having fished at Bonnington Falls on the Kootenay River before it became a world-famous resort, the writer has no hesitation in saying that Mahood Lake greatly excels it both as to quantity and size of fish, which are rainbow trout of about 2 lb. weight and take the fly readily.

Much larger fish may be taken by trolling, but, as our catch was limited to what could be used, a few minutes with a fly-rod generally sufficed to procure all the party could consume.

ACCESSIBILITY.

As before stated, Canim Lake may be reached by motor from 100-Mile House on the Cariboo Road. A motor-boat and small barge could take traffic and freight down Canim Lake. Many years ago a road was cut from Canim to Mahood Lake, about 5 miles, over which a donkey-engine was taken on its way to the Clearwater River. It is thought this old road could be converted into a fair motor-road for about $5,000. At present there is a motor-boat on Canim Lake owned by B. H. McNeil, and pack-horses were used to transport camp outfit and supplies from Canim to Mahood Lake, where there is an ideal camping-ground through which a small spring creek flows. A visit to this region would richly repay any lover of nature.

I have, etc.,

W. S. DREWRY, B.C.L.S.

PHOTO-TOPOGRAPHICAL SURVEY, UPPER NICOLA VALLEY, KAMLOOPS DIVISION OF YALE DISTRICT.

BY R. D. MCCAW.

VICTORIA, B.C., December 14th, 1921.

J. E. Umbach, Esq.,
Surveyor-General, Victoria, B.C.

SIR,—I beg to submit report on field operations carried on by me during the past season, being a continuation of the photo-topographical surveys in the Nicola Valley commenced in that area last year:—

Previous reports of mine have dealt with the technical details involved in the photo-topographical method, so I will not go into these now. A large portion of the area done this year was plateau country and prominences for photographic stations were difficult to obtain. Again, when these were found, the creek-valleys were so obscure that we were compelled to use an auxiliary system for locating valleys, creeks, lakes, and roads. For this purpose stadia

and paced traverses were run where necessary. The latter depended upon compass bearings, and the extremities are located either by triangulation or photographic intersection. Intermediate points were also located where convenient. This same system is employed in many topographical surveys where the contour interval is not less than 100 feet. Elevations in this method are derived by aneroids, using a camp instrument for comparison.

The triangulation is dependent on positions of the Geological Survey of Canada, which, although preliminary, are quite accurate enough for our purposes. This is also a continuation of practice in former years in this locality. The Geological Survey net is based on North American datum. At some future time all our positions can be reduced to data which will be supplied by the Geodetic Survey of Canada. During the past season the preliminary work was done for the extension of the primary net from the existing triangulation at the Coast eastward to about longitude 119° 30′. Two stations selected fall within the watershed of the Nicola River—namely Pennask and Tahaetkun Mountains. Some experimentary work was tried by aerial photography this summer, but the results are not assembled yet, so this will be dealt with later in a supplementary report. This was done by a sea-plane of the Dominion Air Board.

Season's Operations.

The season's operations were started from Merritt on June 22nd, and before organizing the whole party, Iron Mountain, south of Merritt, was visited and new cotton placed upon the Geological Survey signal still standing. A new signal was also placed on top of the high rock bluff north of Nicola Lake. This was intended as a station for connecting with the astronomical station at Merritt, erected by the Dominion Observatory. The new signal was also found to be of considerable use during the summer. On June 24th and 25th, with full party, we moved to a camp on Spahomin Creek, and on the 27th started active field-work. Mount Hamilton (Geological Survey Station) was visited shortly after and the signal rebuilt and new cotton tacked on. For the ensuing few weeks our energies were directed upon the area lying south of the 1920 Sheet and in the vicinity of the Spahomin Creek and Wasley Creek watersheds. The locality consists mainly of low, rolling, hilly country, with south slopes open in part and north slopes and summits timbered. Lakes and meadows are very numerous and the nature of the country required much compass traverse, operated in conjunction with the camera. A beginning was made in the Pennask Lake-Hatheume Lake area, but owing to a local bush fire I thought it better to change my outlined plans, as the outlook for smoke was bad, and leave this area until later. Before leaving the vicinity Gottfriedsen Mountain (Geological Survey Station) was revisited and occupied as a camera station. The signal was still standing and some fresh cotton was put on it.

On July 25th we moved down to Lower Spahomin Creek, and from that date until August 6th photographic work was carried on between Douglas Lake and Minnie Lake, several camera stations being occupied on the Mount Hamilton Ridge. The country is nearly all open, rolling hills, with large areas of flat land in the bottom, and is used as range by the Douglas Lake Cattle Company.

From Minnie Lake we continued up Quilchena Creek and established stations as needed, no definite system being adopted. In this locality stations were occupied on the Siwash-Quilchena watershed overlooking that flat area in the upper reaches of those creeks. Generally the low rolling or flat nature of the surface made photographic stations difficult and on account of thick timber were hard to obtain. Paced traverses were again used and with the other information a fair control was established. One main triangulation station was occupied about 4 miles west of Paradise Lake (a lake on Upper Quilchena Creek).

The Pennask Lake area is practically the same altitude as Upper Quilchena Creek country and similar in type; the divide between Pennask and Quilchena Creeks lies so low in one part as to be difficult of definition. From August 31st to September 3rd we occupied a series of stations on the Pennask Mountain Ridge. These stations average some 1,800 feet above Pennask Lake and give good views over the whole Quilchena-Pennask Plateau, showing the myriads of lakes and meadows scattered over this area. Our base camp was located at Brenda Lake during this period. It was here that my assistant, L. A. Austen-Leigh, B.C.L.S., was taken ill and had to be removed to the Merritt Hospital. Several days were occupied in going to Merritt and getting back again, and while away my party moved camp to Lot 4140 on the Upper Nicola River.

The Gottfriedsen Mountain Station was again occupied for triangulation readings on September 8th and a camera station located on the north end of the ridge a few days later. On September 12th, 13th, and 14th we were moving back to Minnie Lake, finishing some traverse, land-survey connections, etc., on the way down. At Minnie Lake several additional stations were done and on the 21st the camp was moved to Quilchena. Upon this date A. S. Thomson arrived to take Mr. Leigh's place as assistant for the balance of the season, Mr. Leigh having been sent to the Jubilee Hospital in Victoria.

During the balance of the season our energies were directed against the open range country adjacent to Lower Quilchena Creek and along that portion of the Nicola River between Douglas and Nicola Lakes. The rest of the main triangulation stations were occupied and a tie made to the astronomical pier at Merritt. On October 13th operations were closed and I returned to Victoria.

In all, some 65 dozen camera-plates were exposed. The summary of stations occupied is as follows:—

Main triangulation stations	5
Main photographic stations	93
Separate camera stations	198
Miles of compass traverse about	130

In addition, some stadia traverse was done and numerous connections were made to survey corners.

GENERAL.

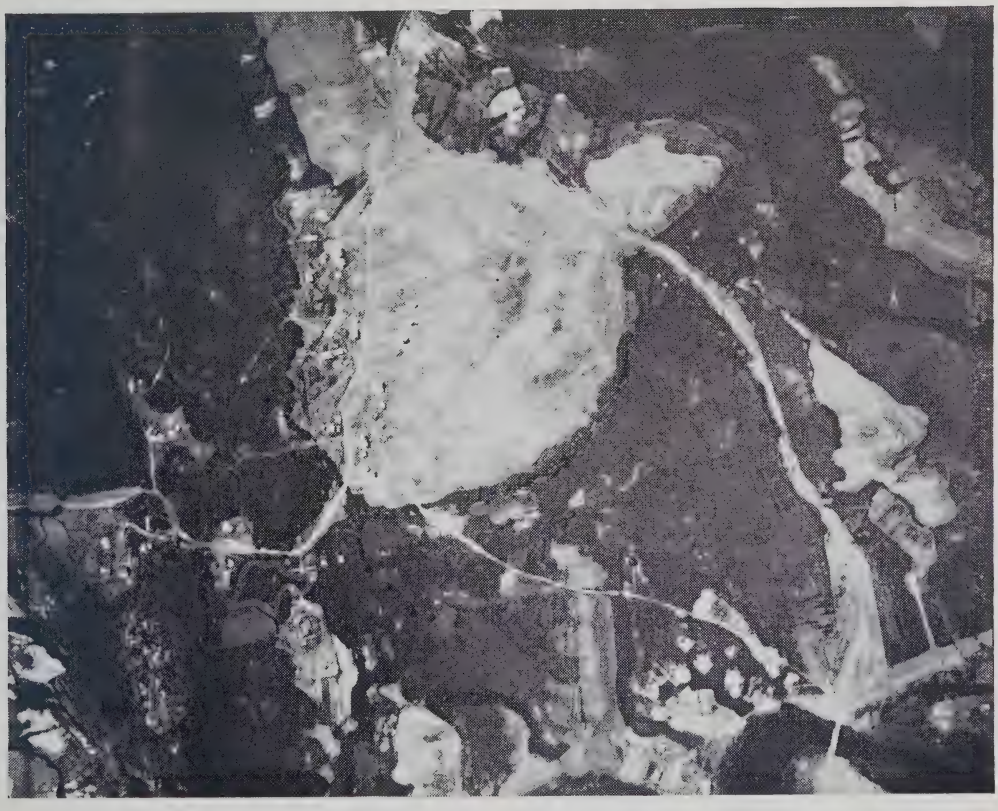
The atmospheric conditions during the season were good. Smoke from bush fires was in evidence often, but no time was lost from this other than that caused by the change in procedure owing to the fire near Hatheume Lake. This fire was brought under subjection by the Fire Warden and did not delay us. With the exception of the first three weeks in September we had very little rain, and throughout the season lost but a few days on this account. The latter part of September and the time in October until we closed down gave excellent camera weather. The days were usually fine and warm with very clear atmosphere. So dry did it become that forest fires began to appear again in the second week in October.

The country done this year is really a ranching area and any grain or hay grown is for feeding live stock owned locally. A pest of grasshoppers in the open areas gave the ranchers considerable concern, as thousands of acres of grass were cut down by them, as well as much grain and vegetables. At times the ground was so thickly covered with them that a step could not be taken without treading on some. During some of their flights the cloud of insects was so thick that camera-work had to be delayed for a few minutes until it was past. In the Pennask-Hatheume country we found considerable activity in the latter part of the season. The large meadows there produce an abundant crop of marsh-grass that was being cut for winter feed for cattle to appear later from adjacent parts. The area is much too high for cultivation and is held solely for range and the hay-crop in the meadows.

The timber in the area under survey is very similar to that of last year—jack-pine with some fir and bull-pine in the lower country, and jack-pine, spruce, and balsam in the high elevations. The open country is dotted with patches and belts of fir, bull-pine, and poplar. The usual pine or timber grass is found in timber except in high altitudes, and in parts this growth is mixed with the various weeds, such as lupine and wild bean. Bunch-grass is generally abundant on the open country, but continued grazing in some areas has reduced this to a poor growth.

The total area of water in the Hatheume-Pennask-Quilchena Plateau is very considerable, as the topographical plan will show. From one station alone twenty-five lakes were counted, ranging from one of 5 or 6 acres in extent to Pennask, the largest lake in that area. Many meadows and swamps exist in all parts of the plateau.

The main trunk road from Merritt to Kamloops is tapped at Quilchena by a branch road to Minnie Lake, and by another up Quilchena Creek to join the main road from Merritt to Princeton. Near Quilchena the Douglas Lake Road leaves the main Merritt–Kamloops Road. Settlers' roads extend up Spahomin and Quilchena Creeks into the Pennask-Hatheume Lake area. This area is well cut up by settlers' roads and trails. A very good pack-trail connects Pennask Lake with Princeton by way of the Siwash-Quilchena Summit. Another trail connects the same lake with Trout Creek (Okanagan slope) by way of Brenda Lake.



Comparison of vertical aerograph with ground view. Lower picture taken 5,000 feet above ground of area outlined on upper view taken in connection with photo-topographical survey of the area.

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There was not a great deal of game seen during the summer, although deer seem to be fairly plentiful. A few grizzlies are said to exist and now and then make a raid on live stock at the edge of the open country near Minnie Lake. Black bear are also there, but not as numerous as farther north. Grouse are plentiful and large flocks of prairie-chickens inhabit the open range. In the Upper Country the beaver is still very much in evidence, although trapping in years gone by has no doubt thinned their numbers. Coyotes are very numerous. Nearly all of the lakes and streams are well stocked with fish. Hatheume is an exception to this. Settlers inform me that the fish in this lake died some few years ago.

The map-work is under way at present and when completed will portray the topography of between 400 and 500 square miles. A triangulation sheet covering both this and last year's work will be submitted, as well as the usual timber-grazing cover sheet. With this report I am turning in a few photographs taken from various points throughout.

I have, etc.,
R. D. McCaw, B.C.L.S.

PHOTO-TOPOGRAPHICAL SURVEY, HAYES, ONE-MILE, AND SUMMERS CREEKS, KAMLOOPS DIVISION OF YALE DISTRICT.

By G. J. Jackson.

Victoria, B.C., December 28th, 1921.

J. E. Umbach, Esq.,
Surveyor-General, Victoria, B.C.

Sir,—I have the honour to submit the following report on the photo-topographic survey made by me during the past summer:—

The area covered was in the Kamloops District in the vicinity and to the east of Princeton, consisting of all the country drained by Hayes (5-Mile) Creek and part of that by 1-Mile and Summers Creeks.

The main 5-Mile Creek commences at Osprey Lake, on the Okanagan-Similkameen watershed, and flows in a south-westerly direction through Link and Chain Lakes, and about 8 miles from the head is joined from the north by Siwash Creek. About 13 miles farther down it is joined from the south-east by Red Creek. At about 25 miles from the head it flows into the Similkameen River. There are several smaller creeks which join it from the east at various points along its course.

After outfitting at Princeton I commenced work in the vicinity of Osprey Lake on June 3rd. Here I connected with the work done by R. D. McCaw during the season of 1917. Working down 5-Mile Creek to the mouth, sufficient stations were occupied to obtain the topography of the valley and several side-trips were made up the smaller creeks.

Red Creek was then ascended to the head, several stations being occupied along it and on the summit. I then worked up Siwash Creek to the headwaters, making side-trips to the watershed on both sides. At the watershed of Siwash and Quilchena Creeks a connection was made with Mr. McCaw's work of this season.

Camp was then moved down to Princeton and after occupying several stations along the Similkameen and up 1-Mile and Summers Creeks the party was disbanded on September 12th.

The season, on the whole, was very good for photographic work. Only four days were lost from rain, although during June and again in September there were many cloudy days with showers. During the first three weeks of August we were handicapped considerably by smoke from forest fires.

The area for the most part was very difficult for our work, as it was all thickly timbered and in most places covered with windfalls. The country is comparatively flat, with low timbered hills, so that satisfactory stations were hard to find, and this necessitated a lot of cutting to get clear views.

The triangulations was controlled by two stations of the Geological Survey of Canada—namely, Kathleen and Missezula—supplemented by two new ones of our own.

During the season 55 dozen views were taken and the following stations occupied:—

Primary stations	2
Secondary stations	2
Main photographic stations	103
Secondary photographic stations	101
Land and railway ties	13

About 20 miles of horse-trail were cut out.

The Kettle Valley Railway from Princeton to Penticton reaches the 5-Mile Valley about 8 miles from Princeton and follows it up past Osprey Lake and into the Valley of Trout Creek, in which it continues down to the Okanagan.

There is a wagon-road along the general course of the railway from Princeton to Osprey Lake, but from there eastward it is not in good repair.

At Link Lake a pack-trail branches off and leads to Pennask Lake by way of Tepee and Galena Lakes over Galena Ridge to the headwaters of Siwash and Quilchena Creeks; thence down Quilchena Creek. There is a good trail up Siwash Creek for about 12 miles, and from there to the head we cut out a rough one to connect with the Pennask Trail. Up Red Creek we found a trail for about 2 miles, but for the rest of the way had to cut a new one through the fallen timber.

The only land suitable for agriculture is the bottom of 5-Mile Valley and several thousand acres of open range between 5-Mile and 1-Mile Creeks near Princeton. Here there are several ranchers engaged in general farming and cattle-raising.

The valley of 5-Mile Creek is narrow, averaging about a mile in width and rising quite steeply on both sides. The last 3 miles at the mouth is a deep narrow canyon. The valley and sides are thickly timbered with black pine and towards the lower stretches there is some yellow pine and fir. Large patches have been burnt in recent years and are now covered with dead timber and windfalls.

Red Creek drains an area of about 75 square miles. This has been badly swept by fire and there is little green to be seen until the headwaters are reached, where there are several meadows with a little grass growing on them.

Siwash Creek has its source in a large flat containing many lakes and meadows which drain south to this creek and north to Quilchena Creek. Considerable hay is cut each year as feed for the cattle which are driven in and wintered there. From this flat the creek runs southerly through a very narrow valley with heavily wooded sides to 5-Mile Creek. It is joined from the east by three creeks which drain a large rolling country extending back to the Okanagan watershed. In this area there are several lakes and hay meadows, but these hardly yield enough to make the cutting worth while. All the Siwash basin is heavily wooded with black pine, the area to the west being badly burnt and full of windfalls.

Game is not plentiful, but there are a few deer and both black and grizzly bear. Beaver were in all the creeks and lakes, but in very small numbers. Grouse were seen over the whole area and up Siwash Creek fool-hens were very numerous. Nearly all the lakes contain trout of good size, while in the creeks small ones are very plentiful.

The work on the maps is now in progress, and, as usual, triangulation, topographical, grazing, and timber maps will be prepared.

I have, etc.,

G. J. JACKSON, B.C.L.S.

SURVEY OF THE BOUNDARY BETWEEN THE PROVINCES OF ALBERTA AND BRITISH COLUMBIA.

BY ARTHUR O. WHEELER.

December 31st, 1921.

J. E. Umbach, Esq.,
Surveyor-General, Victoria, B.C.

SIR,—During the season of 1921 the two divisions of the Interprovincial Boundary survey worked together with the object of completing the second section of the survey—viz., the portion lying between the Canadian Pacific Railway at Kicking Horse Pass and the Canadian National Railways at Yellowhead Pass—and so to permit of an early publication of the report and map-sheets of the said section.

INSTRUCTIONS.

The two divisions were instructed by the Surveyor-General of Dominion Lands, acting on behalf of the Governments concerned, to collaborate with the above object in view. Mr. Cautley's division had, therefore, to survey and monument the four passes that cross the continental divide between Howse Pass and Yellowhead Pass, both surveyed in 1917, of which it was considered advisable to make a survey—viz., Fortress Lake Pass, Athabaska Pass, Whirlpool Pass, and Tonquin Pass.

There are two passes over the continental divide between Howse Pass and Fortress Lake Pass—viz., Bush Pass and Thompson Pass—but an exploration by the topographical division had made it apparent that their survey in detail would not justify the cost. The first, Bush Pass, is a mountaineer's pass, and the second is a narrow gap closed at its western entrance from Bush River Valley by a deep, cliff-bound canyon.

The programme of the topographical division was to close the gap between where work had been discontinued in 1920 and the Tonquin Pass, to which place it had been carried southward from Yellowhead Pass in 1917. Collaboration, also, was necessary with Mr. Cautley's division to establish the monument-sites and erect monuments above timber-line upon outstanding points of the rock-crests containing the valleys of the several passes.

SURVEY OPERATIONS.

Mr. Cautley outfitted his division at Edmonton and proceeded to Jasper, which place he made his headquarters. He commenced work at Fortress Lake Pass, where he arrived with his party on June 10th,

The topographical division organized at Banff and commenced work by testing cameras and other instruments. On June 9th the party left Banff and travelled by trail to Jasper, where it arrived on the 22nd and proceeded to get ready for the survey.

On June 27th the party, in charge of A. J. Campbell, D.L.S., proceeded up the Athabaska Valley and occupied photographic stations there and in the Sunwapta Valley until July 9th, when the party proceeded up the Whirlpool River to the mouth of the Middle Branch of that stream.

On June 26th Mr. Wheeler left the party at Jasper and travelled to Fortress Lake, where he collaborated with Mr. Cautley in establishing the sites for the several monuments placed to make the boundary across the pass.

Mr. Campbell now explored up the Middle Whirlpool Valley and commenced cutting out a trail. On July 15th a light camp was taken to the summit of Athabaska Pass and two camera stations occupied in the vicinity of Mount Hooker to obtain some missing data.

Mr. Cautley's party arrived at Athabaska Pass Summit on the 19th and on the 22nd had the work sufficiently advanced for the Commissioners to decide upon the location of the monuments defining the boundary across it.

July 21st to 30th Mr. Campbell's party was employed in putting a trail up the valley of the Middle Whirlpool to give access to Whirlpool Pass for our own and Mr. Cautley's parties. From then until August 8th camera stations were occupied in the vicinity of Whirlpool Pass.

The party now cut trail down Goat River, on the western side of Whirlpool Pass Summit, to connect with a trail cut by us in 1920, which led up Goat River to reach Fraser Pass, over which pass a move was now made, and on August 11th the party camped at the head of the Fraser River.

From August 12th to September 2nd, during such time as the weather permitted, the party occupied camera stations on both sides of the Fraser Valley. Bush-fire smoke and, later on, rain and clouds interfered greatly during this part of the work.

By August 18th Mr. Cautley's division had the location at Whirlpool Pass laid out and the Commissioners were able to decide upon the position of the monuments. This was done between the 19th and 23rd and brass bolts and cairns placed on rock points above timber-line.

September 3rd Mr. Campbell moved the climbing party to the mouth of Geikie Creek and from the 5th to the 8th occupied five camera stations. He then moved to the Tonquin Valley and by way of Tonquin Pass, Maccarib Pass, and Marmot Pass arrived at Jasper, the closing of the survey with that of 1917 having been effected.

On September 11th I paid off three members of the party and instructed Mr. Campbell to proceed with two assistants up the valley of the Miette River to its head and to ascertain how

many passes of the continental divide, lying between Yellowhead Pass and Robson Pass, would be likely to require survey and monumenting. He was engaged upon this work until September 21st, on which date he arrived back at Jasper. Meanwhile one man had been left at Dominion Prairie, in the Miette Valley, with the horses, and on completion of the Miette exploration Mr. Campbell and his assistant returned with them and the packers to Banff, reaching that place on October 4th.

On September 13th I joined Mr. Cautley at Tonquin Pass and collaborated with him in locating the monuments across the two passages of the pass and in placing bolts and cairns upon the bounding rock ridges.

Testing the cameras and transits used for the photographic work completed the field season and the balance of the party was paid off between October 6th and 8th.

Fortress Lake Pass.

Mr. Cautley's detailed survey of the pass summit, during which a number of cross-sections were made, showed it to be one of the most peculiar of the many crossing the continental divide. It consisted of a narrow neck or isthmus of land, thickly timbered, of which the greatest width is 35 chains and the least width 17 chains, separating the waters of Chaba River from those of Fortress Lake, the first flowing to Athabaska River and Hudson's Bay, and the last by way of its outlet, Wood River, to the Columbia and the Pacific Ocean. The difference of level of the two bodies of water is less than 20 feet and the floor of the flat is composed of sand and gravel. It is certain, from surface indications, that there is a very considerable seepage from the river to the lake. From crest to crest the valley is 2¾ miles wide.

A large body of good timber stands at the eastern end of the lake and rises high up the enclosing slopes for several miles along the lake-basin. At the west end also there is some good timber, which extends down the valley of Wood River and up the valley of Alnus Creek for a considerable distance. Alnus Creek from the north joins Wood River near its exit from the lake.

While on the way to the pass summit I met an old lumberman who had conceived the project of taking out this timber by way of Chaba River and had been prospecting the possibility of hauling it across the isthmus.

A trail leads from Jasper to Fortress Lake, which is an objective for tourists. It is a very bad trail in spots and entails a dangerous crossing of Sunwapta River near its junction with the Athabaska; there is also a crossing of the Athabaska River close by its junction with the Chaba. To avoid the dangerous Sunwapta crossing Mr. Cautley travelled several miles up that stream and built a good bridge across the Sunwapta Canyon at a place where there is a most wildly picturesque fall and where the canyon is some 30 to 40 feet wide. He then cut out a trail to connect with that up the Athabaska. I was very glad to take advantage of this safe route.

Athabaska Pass.

The summit is reached by a rather boggy trail up the South Whirlpool River, with no very steep hills intervening. It is a peculiar fact that, although this line of travel was one of the main fur-trading routes of the North-west and Hudson's Bay Companies during the early part of the nineteenth century, and although hundreds of voyageurs and Indians must have passed over it with their outfits, to-day it is so grown over and obliterated as to be almost indistinguishable, except for a modern horse-track and a few old blazes and rotten logs where cut out of the way and piled on one side many years ago.

At the summit of the pass it is very beautiful in fine weather, park-like alp-lands and open grassy meadows, interspersed with groves of spruce and balsam, are hemmed in by the perpendicular precipices of McGillivray Rock on the east side and the snowy heights of Mount Brown on the west. It is distinguished by three little mountain tarns, of which the centre one is renowned under the cognomen of "Committee's Punch Bowl," with reference to the early days of the fur-traders. From this little lake, which is directly on the watershed, the water flows north to the Arctic Ocean and south to the Pacific. The main source of the Whirlpool River is the outflow from the Kane and Scott Glaciers, which have their origin in ice-fields surrounding Mount Hooker. They join the stream from the pass summit—Arctic Creek—some miles down the valley. The small stream flowing south from the Committee's Punch Bowl to join Wood River is named Pacific Creek.

On the east side McGillivray Rock apparently rises almost sheer for more than 2,000 feet directly from the waters of the Punch Bowl. On the west is a high rocky plateau much indented by ice-cut troughs, holding small ponds and lakelets and rising gradually to the steep walls of Mount Brown. The polished surfaces of these rock ridges and the general appearance of the passage across the divide give rise to the speculation that, in terms of geological time, the pass has here only recently been uncovered by the ice.

It will be remembered that the heights of Mounts Brown and Hooker were originally set by David Douglas, the botanist, at respectively 16,000 and 15,700 feet above sea-level, and for many years have been handed down in text-books at those or higher figures. The two mountains have now been definitely located by the Boundary Survey and their altitudes established at 9,156 feet for Mount Brown and 10,782 feet for Mount Hooker.

The valley at the pass summit is confined by the crest ridge of McGillivray Rock and the south ridge of Mount Brown, 2¼ miles from point to point. As a line of travel across the mountains from east to west it is a rough and awesome road, and in the light of modern methods of travel one can well appreciate the herculean labours of the early explorers.

Whirlpool Pass.

The name "Whirlpool Pass" has not been definitely accepted by the Geographic Board and is subject to change. The Middle Whirlpool River flows in a narrow valley that may well be designated a canyon near its junction with the South Whirlpool. There was no previous access in the form of a trail up the valley, so, as stated above, Mr. Campbell's party set to work to make one in order to assist Mr. Cautley's party to get to the summit of the pass and so avoid loss of time. The making of the trail, which had to be placed high up on the side of the canyon, entailed a lot of hard work, as the location is a difficult one. Mr. Campbell and his men made a very good trail. Once the canyon is passed the going is easier, and a broad, wide-open meadow some 6 or 7 miles up the valley helped greatly. Here there is unlimited pasture for a large number of horses. About 4 miles on lies the summit of the pass, which is thickly timbered with spruce, pine, and balsam of moderate size. There is also a body of good-sized timber near the mouth of the valley.

The approach on both sides of the summit of the pass is rough and rocky and in many places is boggy. On the western side the valley of Goat River is thickly timbered, but the timber is of comparatively small size, chiefly pine and spruce.

The most striking feature of the summit is the inroad of two small rocky gorges which are cut back to the watershed, that division-line passing directly at their heads. They are very wild and picturesque in a miniature sort of way. The sky-line limits of the valley are 2 miles apart in an air-line.

Fraser River Valley.

Some 3 miles down Goat River Valley from the summit of Whirlpool Pass a tributary valley leads northward over a high, open grass-land divide, which separates its waters from the waters of Fraser River and forms the beginning of a broad valley leading north-west, in which the initial source of Fraser River flows. The watershed parallels the Fraser Valley and by occupying stations from side to side it was a simple matter to map its location. The valley is described in the report of the Surveyor-General for 1920.

Some 20 miles down the valley Geikie Creek comes in on the east from a snow-bound amphitheatre at the southern base of Mount Geikie. On the north side of the Geikie Range lies the wide-open valley of Tonquin Pass, across which the watershed is located, passing close to the west end of Moat Lake.

Scenically it is a very beautiful spot, showing wide-open, grassy alp-lands, surrounded on all sides by snowy peaks of rugged and bizarre formation. The Geikie Range, of which Mount Geikie (10,854 feet) is the key-note, rises in sheer inaccessible cliffs, presenting a wonderful array of pinnacles, towers, ramparts, and serrated crests.

In the centre of the pass stands Tonquin Hill (7,858 feet), and I know of no more wonderful and impressive view of primitive nature at its wildest and best than can be had from the summit. Tonquin Hill divides the pass into two passages, of which the northern one has been named Vista Passage, owing to the fact that it lies close below Vista Peak; the southern one has been named Moat Passage, on account of Moat Lake filling up a considerable part of it. The entire width of the valley at the summit of Tonquin Pass from crest to crest of the bounding rock-ridges

is 3¼ miles in an air-line. The Moat Passage is a little over 2 miles and the Vista Passage 1¾ miles; the last two estimates are to Tonquin Hill.

Here also the impression of geologically recent uncovering of the ice is conveyed, for, upon close investigation, the wide-spreading grassy meadows are found to be thickly strewn with large boulders and marshy places; and it would seem that the entire valley had, at some bygone age, been filled in by rock-slides, which as yet are insufficiently covered by humus and verdure to be easy for travel.

This valley was covered by the 1917 survey south from Yellowhead Pass and on the east by Mr. Bridgland's survey of Jasper Park, which lies on the Alberta side of the watershed; so that our survey of the Fraser Valley connected with it and completed the survey of the watershed from the Canadian Pacific Railway to the Canadian National Railways.

GAME AND FISH.

Both game and fish were more apparent than in previous years. Small deer were seen frequently while passing over the trails, and particularly so at the summit of Fortress Lake Pass. The high valleys above the lake-basin are the haunts of caribou, and moose have also been seen in the vicinity of the eastern end of the lake.

Small deer were seen at Athabaska Pass and caribou and smaller deer in the Fraser Valley and in Tonquin Pass and its surrounding open, grassy valleys. Caribou and sheep were noted at the head of the Miette Valley. Mountain-goats are frequently seen high up on the peaks throughout.

Brown bear were plentiful in the vicinity of Jasper, and, in fact, may be encountered at any time in the valleys. Grizzlies are not so much in evidence, but are to be seen occasionally.

Some large trout up to 5 lb. weight were caught in the South Whirlpool River and up to 3 lb. in the Middle Whirlpool Valley, where the stream meanders in a tortuous, deep channel through the wide meadow referred to above. A smaller size can be had in plenty where the stream has a swifter and more shallow course. It is likely that all the tributary streams of the Whirlpool and of the Athabaska below the canyon carry trout.

GENERAL REMARKS.

The section of mountains lying between Fortress Lake Pass and Tonquin Pass contains some very fine scenic effects, particularly those bordering on Wood River and between it and Athabaska Pass. A fine region also lies at the heads of the Middle and North Whirlpool Rivers right up to Tonquin Pass, where the mountains are better known.

All this wide area of mountainous country is difficult of access at present. Trails are few and far between and such as are in existence are little better than horse-tracks and furnish the worst kind of travel. They are for the most part rocky and boggy and the axe is frequently called into requisition. The trail leading from Tonquin Pass to the Athabaska Valley is the worst I have ever seen, so much so that it is only possible to ride over it at intervals.

All the valleys are more or less heavily timbered, but, with some few exceptions, the timber is so located as to make it a negligible quantity owing to inaccessibility. The chief exceptions to this are the bodies of timber at both ends of Fortress Lake and those tributary to the main Whirlpool River. In the first case it depends upon the possibility of being able to use the Chaba and Wood Rivers for transportation purposes. There are some good stands of merchantable timber in the Fraser Valley, but this stream above its entrance into the valley of Yellowhead Pass is guarded by a deep, precipitously walled canyon and it is questionable if it will permit of the passage of logs.

The second section of the survey between the Canadian Pacific Railway and the Canadian National Railways is now finished and as soon as possible the report and maps will be completed and published.

I have, etc.,

ARTHUR O. WHEELER,

Interprovincial Boundary Commissioner.

VICTORIA, B.C.
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1922.

PROVINCE OF BRITISH COLUMBIA

REPORT

OF

THE FOREST BRANCH

OF THE

DEPARTMENT OF LANDS

HON. T. D. PATTULLO, *Minister.*

P. Z. CAVERHILL, *Chief Forester.*

FOR THE YEAR ENDING DECEMBER 31ST

1921

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1922.

VICTORIA, B.C., February 21st, 1922.

To His Honour WALTER CAMERON NICHOL,
Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

Herewith I beg respectfully to submit the Annual Report of the Forest Branch of the Department of Lands for the year 1921.

T. D. PATTULLO,
Minister of Lands.

The Hon. T. D. Pattullo,
Minister of Lands, Victoria, B.C.

Sir,—There are submitted herewith statistical tables with a brief comment thereon, covering the main activities of the Branch during the calendar year 1921.

P. Z. CAVERHILL,
Chief Forester.

REPORT OF THE FOREST BRANCH,

DEPARTMENT OF LANDS.

The year 1921 will be remembered as a period of readjustment and deflation. In no case has this condition been more marked and obtained more promising results than in the lumber industry of British Columbia. Early in the year prices of lumber products were dropped close to pre-war levels and in general have been throughout the year 40 to 50 per cent. below those prevailing in 1920, a level only justified on the assumption that replacement values could be materially reduced. The result was gratifying, demand strengthened, and foreign trade increased. Labour responded by accepting reduced wages and increasing efficiency. Provisions also declined and with the close of the year deflation in equipment was progressing.

The year has not been without its successes, and in some fields new records have been created, new milestones passed, which mean much for the future of the industry. Readjustment and deflation have caused a close scrutiny of cost of production, which has been brought to a minimum; new foreign fields have been entered and new markets developed. In spite of the financial depression, the volume of business done, as shown by the scale, exceeds any previous year, except only 1920. The revenue charged on operations was $1,544,251, as against $1,547,461 in 1920.

WATER-BORNE EXPORT.

The export demand remained strong throughout the year, especially from Japan and China. The Japanese trade increased from 5,990,266 to 52,447,160 feet B.M. and the Chinese trade showed an increase of 180 per cent. over the previous year. Of still greater interest is the increase in United States coastal trade. In 1920 4,162,848 feet were supplied, whereas the record for 1921 was 25,553,543 feet. The total export was 188,000,000 feet, an increase of 42,000,000 feet for the year and a new record for British Columbia. This business now exceeds 10 per cent. of the total scale of all forest products and 20 per cent. of logs scaled west of the Cascades, after deducting for those going to pulp plants, shingle-mills, and for export direct. A still further encouraging feature of our export business is the increase shown in relation to the total export from the Douglas fir region. In 1916 we contributed only 3.1 per cent.; in 1920, 8.65 per cent.; and during 1921, 9.6 per cent. This rapid increase is in a large measure attributable to better co-operation and organization in handling the export business. The organization of the Associated Timber Exporters of British Columbia, the formation of several export companies, now gives a foreign buyer direct contact with British Columbia exporters, while the Canadian Mercantile Marine has aided in solving the shipping problem.

LUMBER EXPORTED, 1919, 1920, AND 1921.

Destination.	1919.	1920.	1921.
	Feet B.M.	Feet B.M.	Feet B.M.
Australia	8,515,600	32,218,155	27,275,928
New Zealand	.....	4,159,099	4,553,603
South America	1,551,574	5,523,102	1,317,825
China	17,183,430	14,911,232	41,944,011
Japan	4,675,730	5,990,266	52,447,160
United Kingdom and Continent	65,381,100	61,217,805	13,592,562
South Africa	5,044,672	7,330,531	2,931,969
India and Straits Settlements	475,088	5,619,747	8,429,403
United States	5,259,346	4,162,845	25,553,543
Philippine and Hawaiian Islands	785,726	2,996,123	1,158,805
West Indies and Cuba	.....	1,479,950	20,668
South Sea Islands	.....	.....	941,422
Mexico	.....	1,015,414	.....
Egypt	.....	.....	8,566,400
Totals	108,872,266	146,624,269	188,733,299

WATER-BORNE SHIPMENTS

FROM

DOUGLAS FIR REGION

B.C. PORTION SHEWN BLACK

WATER-BORNE SHIPMENTS

FROM

B.C.

AS COMPARED WITH

TOTAL SCALE

1916

1917

1918

1919

1920

1921

LUMBER TRADE EXTENSION.

Educational work was continued. Significant results from the work in Eastern Canada are beginning to show. These include changes in specifications for engineering-works and in the building codes of the various cities, so that British Columbia woods are included where before only Eastern or foreign woods were used. The work done on battery separators has led to the completion of a plant for their manufacture, an entirely new industry for British Columbia. The results from this work will be cumulative and each year hereafter will bring its contribution to the industry.

One of the noteworthy achievements of the year was the co-operative arrangement for a permanent lumber display at Toronto. Each of the various associations pledged itself to contribute funds for this work and thus recognized the vital interest and obligation of all in this important question.

New premises in which the exhibit will be housed have been secured at 51 Yonge Street, Toronto, in the heart of the down-town business and financial district. Here it is planned to construct a modern suite of rooms, finished and furnished with British Columbia lumber products, so that architects and builders will have every opportunity to study effects in the finished product rather than in the rough.

The display of British Columbia wood products was again awarded a diploma and gold medal at the Canadian National Exhibition.

Lumber Commissioner Turnbull, following up trade prospects in Europe and Egypt, left for England and is still in London, where he is carrying on educational work and assisting the Agent-General of the Province in timber matters.

TRADE PUBLICITY.

During the year the Department had prepared several rolls of motion pictures illustrating various phases of the industry. These have been shown through co-operation with the Lumber and Shingle Associations. Films were also taken to London for the use of the Agent-General and the Lumber Commissioner in publicity work in England.

Farmers' bulletins were also distributed through the "better-farming movement" on the Prairies and direct to inquirers. The new series, "Uses, Strengths, and Working Stresses of B.C. Woods," was distributed to architects and builders through the Canadian Trade Commissioners throughout the world, the Agent-General in London, and Lumber Commissioner's office in Toronto. In all, some 40,000 of these booklets were sent out. Samples of the various species of woods have also been distributed to educational institutions and also in response to trade inquiries at home and abroad.

Advertising, calling attention to the use of British Columbia woods, was again carried in the various trade and professional journals.

FOREST PRODUCTION.

The value of production shows a marked falling-off, being placed at $64,970,000 for the year, as compared with $92,628,000 for 1920. Almost every item shows a decrease and it is especially noted in lumber, pulp, paper, and shingles. This is accounted for chiefly on account of falling prices, although in some instances quantities were also reduced. Prices during the year have apparently reached bottom and were advancing with the close of the year. It is encouraging to note that, excepting 1919 and 1920, years of inflated prices, the value is higher than in any preceding year.

ESTIMATED VALUE OF PRODUCTION.

Product.	1918.	1919.	1920.	1921.
Lumber	$26,219,697	$31,000,000	$46,952,500	$33,533,000
Pulp and paper	10,517,250	12,554,257	21,611,681	13,500,000
Shingles	5,305,417	12,801,564	12,081,476	7,032,000
Boxes	1,845,195	2,142,000	2,650,000	2,000,000
Piles, poles, and mine-props	1,087,418	1,532,448	1,543,087	1,479,000
Miscellaneous	1,773,821	5,256,520	1,495,729	1,180,000
Ties, railway	.....	2,091,346	2,250,682	2,314,000
Additional value contributed by the wood-cutting industry	1,689,810	1,720,000	2,580,000	2,034,000
Product of Dominion lands	4,953,829	*	*	*
Laths	120,278	195,594	847,920	250,000
Logs exported	148,808	991,365	615,732	1,648,000
Totals	$54,162,523	$70,285,094	$92,628,807	$64,970,000

* Included in other items.

PULP AND PAPER.

The pulp industry suffered severely through falling prices and slow buying, especially on sulphite and sulphate products, and some of the mills had to close for a time. Paper-mills ran throughout the year, although at slightly below capacity.

Output figures are as follows:—

Pulp.	1919.	1920.	1921.
	Tons.	Tons.	Tons.
Sulphite	80,347	92,299	68,502
Sulphate	9,473	16,380	6,519
Ground wood	99,769	108,665	89,725

All of the ground wood and 30,000 tons of sulphate were manufactured into paper, the products being:—

Product.	1919.	1920.	1921.
	Tons.	Tons.	Tons.
Newsprint	123,607	136,832	110,176
Other papers	7,202	9,792	6,934

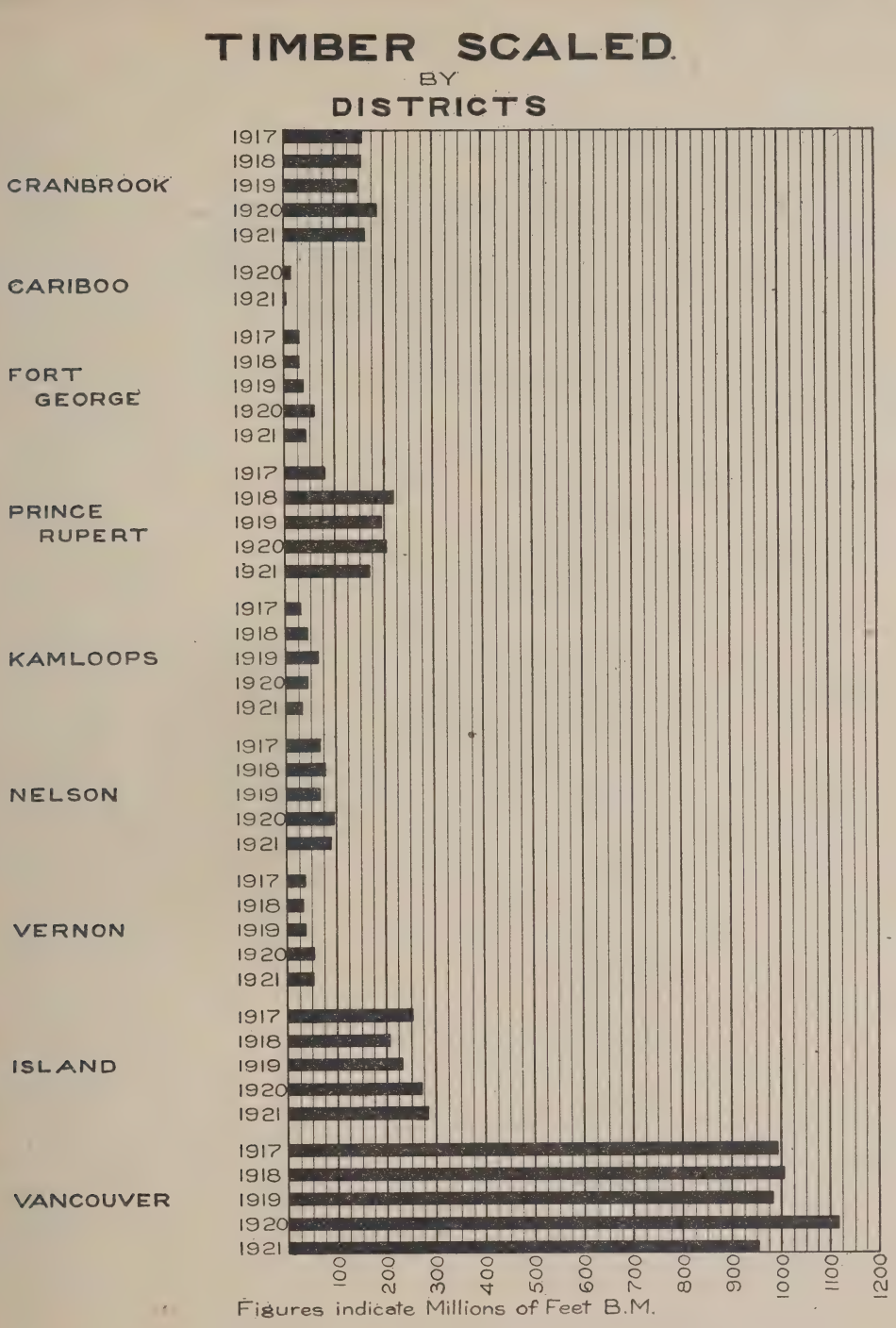
TIMBER SCALED.

The quantity of timber scaled for the year shows a drop of 256,000,000 feet, or 12 per cent. The production is greater, however, than was expected in face of the adverse conditions prevailing, and exceeds, excepting 1920, all previous years. The cut of ties, 3,856,203, was the largest on record and accounts for the large cut of lodge-pole pine, which is fast being recognized as *the* tie-wood.

TIMBER SCALED IN BRITISH COLUMBIA IN 1921 (BY MONTHS AND DISTRICTS).

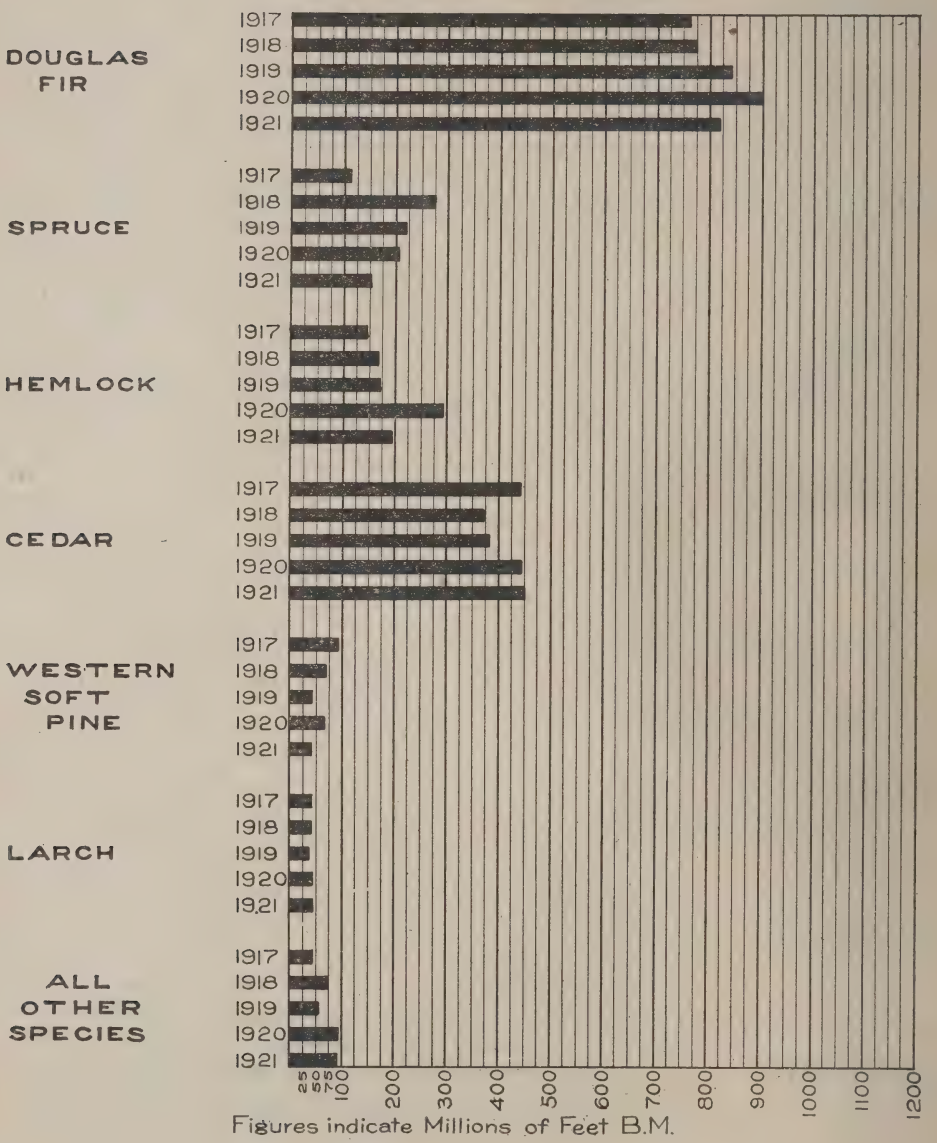
		Cranbrook.	Prince George.	Cariboo.	Kamloops.	Nelson.	Vernon.	Island.	Prince Rupert.	Vancouver.	Total Logs, M.B.M.	Total Lineal Feet, Thds.	Total Cords.	Total Ties.
January	logs, M.B.M.	9,491	3,809	12	1,483	2,312	2,265	16,799	3,865	74,323	114,359	.....	.....	.....
"	lineal ft., thds.	269	3	4	20	324	243	441	13	232	.....	1,549	.....	.....
"	cords	5,094	581	29	16	387	61	2,539	127	3,196	.....	.....	12,030	.....
"	ties	49,361	80,967	1,460	20,829	10,178	1,624	.....	.....	2,195	.....	.....	.....	166,614
February	logs, M.B.M.	4,709	1,375	99	1,768	2,997	1,755	20,668	4,001	49,236	86,608	.....	.....	.....
"	lineal ft., thds.	11	13	.....	2	207	.....	314	182	396	.....	1,125	.....	.....
"	cords	104	60	94	.....	1,362	96	53	55	11,538	.....	.....	13,362	.....
"	ties	21,649	114,039	9,338	30,475	19,753	43,369	7,064	44,480	2,223	.....	.....	.....	292,390
March	logs, M.B.M.	9,439	1,515	15	369	2,124	6,217	15,232	3,655	58,388	96,954	.....	.....	.....
"	lineal ft., thds.	31	69	3	12	360	229	425	409	279	.....	1,817	.....	.....
"	cords	382	464	1,857	.....	2,387	256	406	205	5,966	.....	.....	11,923	.....
"	ties	68,133	142,929	.....	18,852	42,637	10,265	11,157	6,000	25,633	.....	.....	.....	325,606
April	logs, M.B.M.	13,407	415	.....	2,365	1,033	5,204	15,212	7,073	76,840	121,549	.....	.....	.....
"	lineal ft., thds.	743	87	.....	51	402	132	377	284	180	.....	2,256	.....	.....
"	cords	2,876	120	65	68	1,069	.....	125	21	5,992	.....	.....	10,336	.....
"	ties	230,823	81,950	37,055	71,189	8,828	2,229	.....	161,833	12,371	.....	.....	.....	606,278
May	logs, M.B.M.	14,899	772	12	266	3,681	3,145	22,152	10,527	88,592	144,046	.....	.....	.....
"	lineal ft., thds.	180	67	30	.....	181	195	36	3	317	.....	1,009	.....	.....
"	cords	1,204	171	180	.....	650	124	236	.....	9,771	.....	.....	12,336	.....
"	ties	238,533	109,145	25,608	4,060	38,375	19,001	.....	.....	38,757	.....	.....	.....	473,479
June	logs, M.B.M.	7,547	1,829	70	6,488	1,663	6,632	17,182	16,685	92,384	150,480	.....	.....	.....
"	lineal ft., thds.	52	69	.....	23	201	186	454	67	277	.....	1,329	.....	.....
"	cords	1,550	128	10	.....	269	63	451	390	12,670	.....	.....	15,531	.....
"	ties	51,707	26,971	538	139,098	16,475	20,430	.....	7,946	26,563	.....	.....	.....	289,728
July	logs, M.B.M.	13,688	3,157	68	.....	4,968	4,076	22,276	18,489	83,242	149,964	.....	.....	.....
"	lineal ft., thds.	62	18	.....	.....	304	33	344	2	221	.....	984	.....	.....
"	cords	999	80	.....	.....	461	.....	211	.....	5,403	.....	.....	7,154	.....
"	ties	64,233	14,916	.....	.....	51,642	43,493	1,675	375,451	17,546	.....	.....	.....	568,956
August	logs, M.B.M.	13,929	3,874	185	449	9,556	4,650	37,183	16,284	70,422	156,532	.....	.....	.....
"	lineal ft., thds.	83	20	.....	69	251	.....	215	226	436	.....	1,300	.....	.....
"	cords	3,573	228	.....	115	541	.....	461	111	13,236	.....	.....	18,265	.....
"	ties	112,850	14,916	.....	65,390	30,318	.....	212,233	14,972	66,335	.....	.....	.....	517,014
September	logs, M.B.M.	8,758	2,222	44	920	2,599	1,217	21,777	10,317	66,697	114,551	.....	.....	.....
"	lineal ft., thds.	2	.....	.....	10	275	34	82	32	625	.....	1,060	.....	.....
"	cords	986	45	.....	8	727	9	5,313	30	14,110	.....	.....	21,228	.....
"	ties	192,437	2,664	.....	8,044	4,264	3,903	990	369	60,948	.....	.....	.....	273,619
October	logs, M.B.M.	5,005	1,393	83	953	778	3,620	14,151	20,132	63,572	109,687	.....	.....	.....
"	lineal ft., thds.	39	20	17	161	2,665	.....	148	6	282	.....	3,338	.....	.....
"	cords	100	106	.....	.....	1,992	90	1,849	.....	15,040	.....	.....	19,177	.....
"	ties	71,455	.....	115	6,589	17,156	557	.....	.....	431	.....	.....	.....	96,303
November	logs, M.B.M.	1,401	1,186	75	318	10,360	786	15,421	12,995	70,120	112,662	.....	.....	.....
"	lineal ft., thds.	33	12	.....	4	538	63	64	.....	2,707	.....	3,421	.....	.....
"	cords	3,754	425	323	28	866	144	3,759	.....	13,089	.....	.....	22,388	.....
"	ties	79,527	.....	.....	.....	8,582	.....	.....	.....	.....	.....	.....	.....	88,109
December	logs, M.B.M.	2,042	463	.....	733	2,321	2,086	36,094	20,160	59,963	123,862	.....	.....	.....
"	lineal ft., thds.	62	24	.....	18	307	112	33	189	117	.....	862	.....	.....
"	cords	417	148	33	144	331	6	509	901	9,795	.....	.....	12,284	.....
"	ties	47,078	.....	.....	58,743	52,171	27	.....	88	.....	.....	.....	.....	158,107
Totals	logs, M.B.M.	104,315	22,010	663	16,112	44,392	41,653	254,147	144,183	853,779	1,481,254	.....	.....	.....
"	lineal ft., thds.	1,567	402	54	370	6,015	1,227	2,933	1,413	6,069	.....	20,050	.....	.....
"	cords	21,039	2,556	2,591	379	11,042	849	15,912	1,840	119,806	.....	.....	176,014	.....
"	ties	1,227,786	588,497	74,114	423,269	300,379	144898	233,119	611,139	253,002	.....	.....	.....	3,856,203

Total scaled, 1,790,017,365 feet B.M.


TIMBER SCALED
BY
DISTRICTS
CRANBROOK
1917
1918
1919
1920
1921
CARIBOO
1920
1921
FORT GEORGE
1917
1918
1919
1920
1921
PRINCE RUPERT
1917
1918
1919
1920
1921
KAMLOOPS
1917
1918
1919
1920
1921
NELSON
1917
1918
1919
1920
1921
VERNON
1917
1918
1919
1920
1921
ISLAND
1917
1918
1919
1920
1921
VANCOUVER
1917
1918
1919
1920
1921
100
200
300
400
500
600
700
800
900
1000
1100
1200
Figures indicate Millions of Feet B.M.

SPECIES CUT

1921



Figures indicate Millions of Feet B.M.

Species cut, 1921.

Forest District.	Douglas Fir, M.B.M.	Red Cedar, M.B.M.	Spruce, M.B.M.	Hemlock, M.B.M.	Balsam, M.B.M.	Yellow Pine, M.B.M.	White Pine, M.B.M.	Jack-pine, M.B.M.	Larch, M.B.M.	Cottonwood, M.B.M.	Other Species, M.B.M.	Total, M.B.M.
Cranbrook	78,915	4,560	23,449	1,829	746	11,009	8,469	3,954	27,680	427	....	161,038
Cariboo	3,459	9	157	.....	900	15	.....	.....	.....	.....	....	4,540
Prince George	8,648	2,182	17,520	5	2,153	.....	.....	13,177	3	1	....	43,689
Kamloops	21,874	3,310	2,958	152	116	386	178	2,406	.....	.....	....	31,380
Nelson	12,693	38,247	1,651	11,035	2,142	6,419	7,050	.....	10,013	124	....	89,374
Vernon	19,323	4,132	91	267	5,587	20,804	413	209	1,564	334	17	52,741
Totals, Interior	144,912	52,440	45,826	13,288	11,644	38,633	16,110	19,746	39,260	886	17	382,762
Prince Rupert	6,490	32,988	75,372	30,355	14,003	.....	.....	11,020	.....	1,037	....	171,265
Island	180,004	54,660	8,890	38,202	971	751	290	.....	267	22	....	284,057
Vancouver	489,619	310,280	21,704	113,160	5,405	2,485	2,438	19	5,718	1,016	89	951,933
Totals, Coast	676,113	397,928	105,966	181,717	20,379	3,236	2,728	11,039	5,985	2,075	89	1,407,255
Grand totals, 1921	821,025	450,368	151,792	195,005	32,023	41,869	18,838	30,785	45,245	2,961	106	1,790,017
Grand totals, 1920	901,442	445,957	203,246	291,585	49,112	65,213	31,465	11,616	40,754	6,046	32	2,046,468

Total Amounts of Timber scaled in British Columbia for Years 1920–21
(Comparative Statement in Board-feet).

Forest District.	1920.	1921.	Loss.	Gain.	Net Loss.
Cranbrook	187,118,865	161,038,620	26,080,245	.....	.....
Prince George	56,023,381	43,689,461	12,333,920	.....	.....
Williams Lake	14,531,068	4,539,924	9,991,144	.....	.....
Kamloops	40,533,735	31,379,605	9,154,130	.....	.....
Nelson	98,668,328	89,374,662	9,293,666	.....	.....
Vernon	53,428,987	52,740,408	688,579	.....	.....
Totals, Interior	450,304,364	382,762,680	.....	.....	67,541,684
Island	273,752,261	284,056,003	.....	10,303,742	.....
Prince Rupert	202,649,582	171,264,991	31,384,591	.....	.....
Vancouver	1,119,762,752	951,933,691	167,829,061	.....	.....
Totals, Coast	1,596,164,595	1,407,254,685	.....	.....	188,909,910
Totals for B.C.	2,046,468,959	1,790,017,365	.....	.....	256,451,594

TIMBER-SALES.

The demand for timber-sales naturally fell off with the dropping market; 531 sales were disposed of, however, covering an estimated equivalent to 248,000,000 feet, details of which are contained in the following tables. The stumpage prices also declined, not being influenced by the competitive bidding which in 1920 forced some sales to extremely high prices. The average price, however, shows a creditable advance over 1919, being $1.46 for all species, as compared with $1.80 in 1920 and $1.38 in 1919. These figures show conclusively that the Department has a real equity even in the small fractions of timber left from the general staking of previous years. These fractions constitute most of the areas disposed of. The quantity cut from timber-sales exceeded all previous years and reached 11 per cent. of the total cut.

TIMBER-SALES AWARDED BY DISTRICTS, 1921.

Forest District.	No. of Sales.	Acreage.	Saw-timber (Ft. B.M.).	Poles and Piles (Lineal Feet).	No. of Posts.	Shingle-bolts and Cordwood (No. of Cords).	No. of Railway-ties.	Estimated Revenue.
Cariboo	25	6,271	1,182,100	4,870	.....	290	57,900	$ 7,616 46
Cranbrook	41	7,532	9,309,080	67,675	.....	6,570	33,397	34,228 72
Fort George	39	9,400	9,067,109	191,100	.....	1,614	428,958	61,014 76
Kamloops	27	6,794	2,141,000	44,000	.....	.....	171,230	24,625 96
Nelson	73	9,948	15,545,000	1,217,290	.....	2,530	91,350	73,794 82
Prince Rupert	87	9,131	28,349,000	437,885	.....	200	209,332	95,247 20
Vancouver	210	36,248	103,874,000	237,125	.....	20,054	250	290,537 17
Vernon	29	6,290	19,504,485	279,150	.....	3,033	.....	59,422 56
Totals, 1921	531	91,614	188,971,774	2,479,095	.....	34,291	993,417	$ 646,487 65
Totals, 1920	594	121,690	440,649,755	2,811,095	149,360	86,726	6,415,349	$1,799,039 03
Totals, 1919	356	61,809	245,209,300	2,899,000	5,000	52,557	957,804	$ 654,372 99
Totals, 1918	227	34,257	159,659,000	378,080	20,000	18,478	701,654	$ 380,408 33
Totals, 1917	255	44,914	240,307,057	1,517,450	40,000	43,756	381,200	$ 483,281 50
Totals, 1916	133	23,318	136,345,000	435,810	.....	26,666	92,000	$ 259,769 12

AVERAGE SALE PRICE BY SPECIES.

Saw-timber.	FIGURES FOR 1921.		FIGURES FOR 1920.		FIGURES FOR 1919.	
	Board-feet.	Price per M.	Board-feet.	Price per M.	Board-feet.	Price per M.
Douglas fir	44,835,675	$1 65	93,483,893	$2 04	57,456,450	$1 48
Cedar	41,980,000	1 57	75,223,700	2 23	55,655,350	1 54
Spruce	22,588,143	1 60	141,849,200	2 05	69,151,000	1 56
Hemlock	40,866,166	1 55	71,176,462	1 06	28,836,200	73
Balsam fir	12,834,000	98	25,056,500	1 23	17,296,000	82
White pine	1,662,500	1 55	3,457,000	2 06	2,257,500	1 63
Western soft pine	11,009,710	1 82	20,919,000	1 37	7,479,900	1 50
Tamarack	8,679,480	1 79	5,437,000	2 24	3,019,400	1 55
Other species	4,516,100	1 31	4,047,000	1 78	4,057,500	1 18
Totals	188,971,774	$1 46	440,649,755	$1 84	245,209,300	$1 38

TIMBER CUT FROM TIMBER-SALES DURING 1921.

Forest District.	Feet. B.M.	Lineal Feet.	Cords.	Ties.
Cariboo	397,391	3,776	238	31,248
Cranbrook	6,265,979	60,937	1,505	50,289
Fort George	12,389,416	304,775	884	146,322
Kamloops	4,573,677	19,126	14	233,101
Nelson	5,573,432	841,031	405	87,465
Prince Rupert	48,749,953	369,065	293	267,407
Vancouver	92,780,966	140,883	6,841	4,348
Vernon	9,049,242	429,957	303	11,243
Totals, 1921	179,780,056	2,169,550	10,483	831,423
Totals, 1920	168,783,812	1,638,549	17,703	654,829
Totals, 1919	107,701,950	672,699	12,208	573,286
Totals, 1918	113,927,610	499,589	15,539	146,807
Totals, 1917	99,078,832	545,429	14,862	34,937
Totals, 1916	63,055,102	225,799	8,425	.....

SAW AND SHINGLE MILLS OF THE PROVINCE, 1921.

Forest District.	Sawmills.		Shingle-mills.		Sawmills.		Shingle-mills.	
	No.	Operating, Estimated Daily Capacity, M.B.M.	No.	Operating, Estimated Daily Capacity, Shingles, M.	No.	Shut down, Estimated Daily Capacity, M.B.M.	No.	Shut down, Estimated Daily Capacity, Shingles, M.
Cariboo	10	64	..	....	12	75	..	....
Cranbrook	36	1,485	..	....	..	....	..	....
Kamloops	6	303	..	....	2	110	1	3
Nelson	33	660	9	435	13	387	..	....
Prince George	17	218	..	....	9	378	..	....
Prince Rupert	25	456	2	10	18	550	1	85
Vancouver	127	5,122	68	10,440	22	464	4	700
Vernon	35	604	..	....	2	65	..	....
Totals for 1921	289	8,912	79	10,885	78	2,029	6	788
Totals for 1920	341	10,729	109	13,426	37	909	2	30

LOGGING INSPECTION.

In order to ensure the carrying-out of the regulations of the Department and to prevent trespass, inspection is necessary for all logging operations. The records show that 4,053 inspections were made during the year, as against 2,703 for 1920, and for the first time we have been able to have these inspections carried out systematically. There were a greater number of trespasses reported than in previous years, but owing to closer inspection they were discovered sooner and the quantity of timber involved was less than in previous years. Penalties for trespass amounted to $15,924.22, and in addition thirty trespasses were discovered on privately owned lands which were reported to the owners for adjustment.

LOGGING INSPECTION, 1921.

Forest District.	Timber-sales.	Hand-loggers' Licences.	Leases, Licences, Crown Grants, and Pre-emptions.	Total Operations.	No. of Inspections.
Cariboo	22	...	31	53	90
Cranbrook	61	...	84	145	206
Kamloops	53	...	114	167	252
Nelson	113	...	166	279	409
Prince George	61	...	167	228	186
Prince Rupert	77	136	95	308	471
Vancouver	250	50	466	766	2,002
Vernon	54	...	208	262	437
Totals, 1921	691	186	1,331	2,208	4,053
Totals, 1920	605	220	1,961	2,796	2,703
Totals, 1919	365	200	757	1,322	1,884

TRESPASS, 1921.

Forest District.	No. of Cases.	Area cut over (Acres).	Quantity cut.				No. of Resulting Seizures.	Amount.
			Feet B.M.	Lineal Feet.	Cords.	Ties.		
Cariboo	9	297	50,500	.....	40	3,693	..	$ 490 30
Cranbrook	8	583	41,939	.....	967	891	..	640 50
Kamloops	7	115	174,235	1,240	8	1,255	..	757 73
Nelson	13	302	343,868	65,855	146	264	..	2,066 64
Prince George	6	59	256,176	22,625	68	113	..	880 10
Prince Rupert	22	239	1,097,359	87,030	....	10,749	2	4,766 95
Vernon	10	200	574,435	11,700	124	3,000	1	2,121 95
Vancouver	23	143	684,161	20,945	286	1,640	7	4,200 05
Totals, 1921	98	1,938	3,222,673	209,395	1,639	21,605	10	$15,924 22
Totals, 1920	73	1,788	4,904,079	104,048	1,882	6,716	10	$17,119 85
Totals, 1919	87	2,454	12,708,365	48,860	88	87,120	8	$21,730 12

LAND CLASSIFICATION.

AREAS EXAMINED, 1921.

Forest District.	Applications for Crown Grants.		Applications for Grazing and Hay Leases.		Applications for Pre-emption Records.		Applications to Purchase.		Miscellaneous.	
	No.	Acres.	No.	Acres.	No.	Acres.	No.	Acres.	No.	Acres.
Cariboo	15	2,638	94	14,228	138	18,000	103	14,505	58	28,840
Cranbrook	2	120	..	.....	5	775	17	2,850	4	2,129
Fort George	19	3,769	..	.....	149	22,353	52	15,633	18	4,198
Kamloops	2	317	..	.....	10	1,518	4	720	12	6,463
Nelson	10	1,484	..	.....	20	2,268	18	3,012	4	58
Prince Rupert	18	2,435	2	80	22	4,977	48	11,171	66	15,407
Vancouver	24	4,057	2	53	43	5,963	29	4,314	16	1,271
Vernon	15	2,723	3	1,424	37	5,373	34	7,724	1	120
Totals	105	17,543	101	15,785	435	61,227	305	59,929	179	58,486

CLASSIFICATION OF AREAS EXAMINED, 1921.

Forest District.	Total Area.	Agricultural Land.	Area recommended for Reserve.	Estimate of Timber on Reserved Area.
	Acres.	Acres.	Acres.	M.B.M.
Cariboo	78,211	16,742	.....	.....
Cranbrook	5,874	1,015	.....	.....
Fort George	45,953	34,419	4,216	40,458
Kamloops	9,018	2,763	1,432	2,471
Nelson	6,822	2,505	401	2,291
Prince Rupert	34,070	13,191	3,956	69,384
Vancouver	15,658	4,106	2,232	24,837
Vernon	17,364	3,690	1,661	9,836
Totals	212,970	78,431	13,898	149,277

PRE-EMPTION RECORD EXAMINATIONS, 1921.

Cariboo	586
Cranbrook	170
Prince George	879
Kamloops	148
Nelson	99
Prince Rupert	951
Vancouver	921
Vernon	120
Total	3,874

TIMBER EXPORTS.

EXPORT OF LOGS DURING YEAR 1921.

Species.	Grade No. 1.	Grade No. 2.	Grade No. 3.	Ungraded.	Total, 1921.	Total, 1920.
Cedar	7,628,811	27,530,479	15,053,294	1,301,614	51,514,198	
Fir	2,580,986	12,950,741	2,520,636	.....	18,052,363	
Spruce	247,581	2,379,076	950,129	2,725,000	6,301,786	
Hemlock	.....	.....	.....	12,957,278	12,957,278	
Larch	.....	.....	.....	1,109,742	1,109,742	
Other species	.....	.....	.....	281,140	281,140	
Totals, 1921	10,457,378	42,860,296	18,524,059	18,374,774	90,216,507	.....
Totals, 1920	4,013,711	16,521,832	4,315,532	3,822,863	.....	28,673,938

EXPORT OF POLES, PILING, PROPS, TIES, FENCE-POSTS, CORDWOOD, PULP-WOOD, AND SHINGLE-BOLTS, 1921.

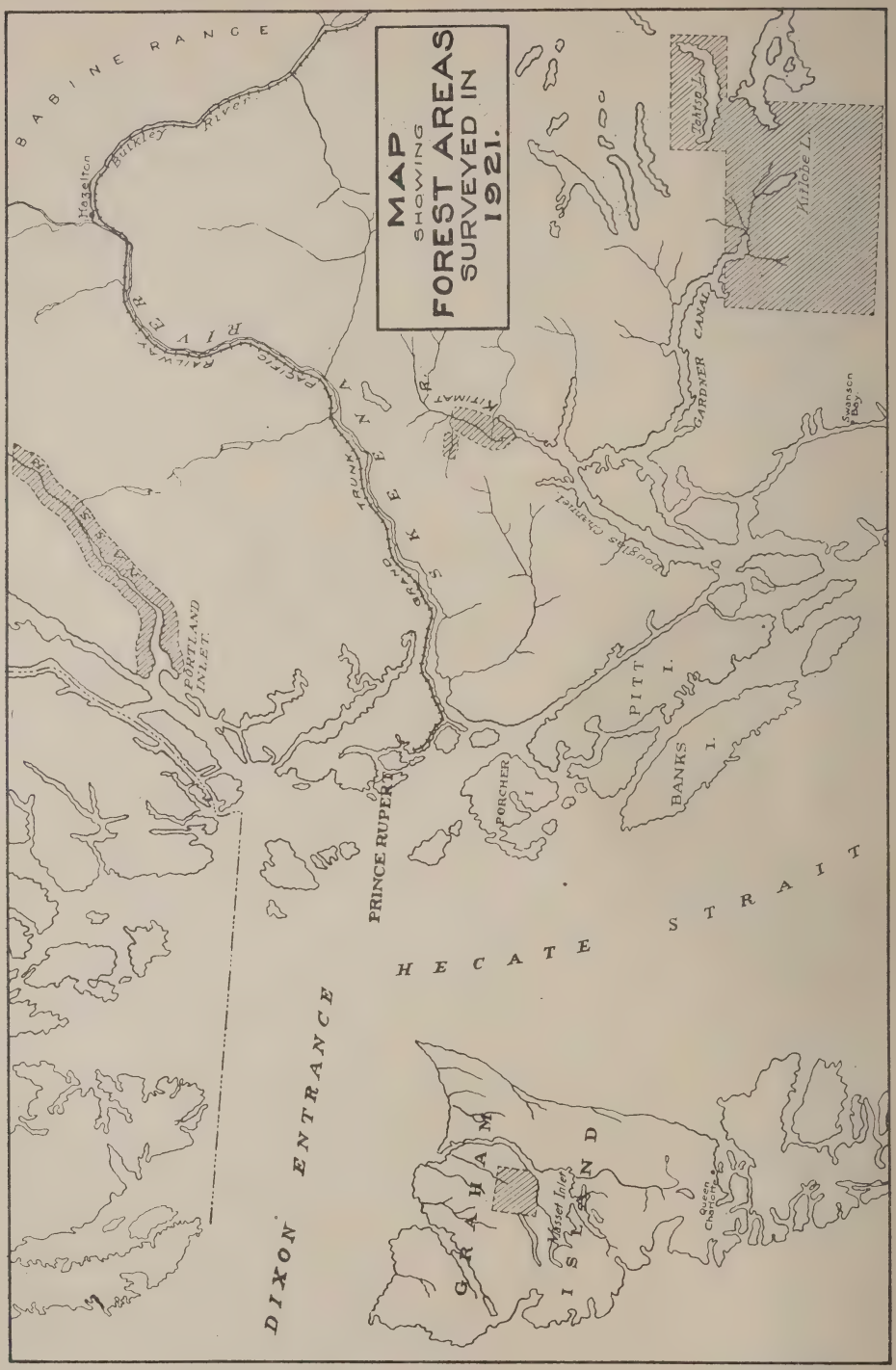
Forest District.	Quantity exported.	Approximate Value, F.O.B.	Where marketed.	
			United States.	Canada.
Cranbrook—				
Cordwood	Cords, 1980	$ 15,840	32	1,948
Piling	Lin. ft., 343,199	34,310	35,935	307,264
Poles	Lin. ft., 34,960	3,496	.....	34,960
Fence-posts	Cords, 17,297	155,673	.....	17,297
Mine-props	Cords, 15,297	152,970	.....	15,297
Mine-ties	Cords, 902	19,844	.....	902
Pulp-wood	Cords, 374	2,618	374	.....
Railway-ties	No., 1,183,122	591,561	.....	1,183,122
Prince George—				
Cedar poles	Lin. ft., 387,020	46,442	66,810	320,210
Cedar piling	Lin. ft., 10,655	1,278	.....	10,655
Mine-props	Cords, 1,088	10,880	.....	1,088
Fence-posts	Cords, 472	4,248	.....	472
Mine-ties	Cords, 48	1,440	.....	48
Cordwood	Cords, 64	512	.....	64
Corral-poles	Cords, 16	144	.....	16
Railway-ties	No., 383,921	264,385	.....	383,921
Kamloops—				
Poles	Lin. ft., 174,105	9,245	81,650	92,455
Fence-posts	Cords, 48	480	.....	48
Nelson—				
Poles	Lin. ft., 3,503,058	245,214	1,142,625	2,360,433
Piling	Lin. ft., 68,666	6,180	56,644	12,022
Fence-posts	Cords, 4,368	34,988	1,488	2,880
Prince Rupert				
Poles	Lin. ft., 6,020	602	6,020	.....
Vancouver—				
Poles	Lin. ft., 1,601,684	160,168	1,601,684	.....
Shingle-bolts	Cords, 1,107	10,516	1,107	.....
Totals, 1921	.....	$1,773,034	.....	.....
Totals, 1920	.....	$1,486,691	.....	.....

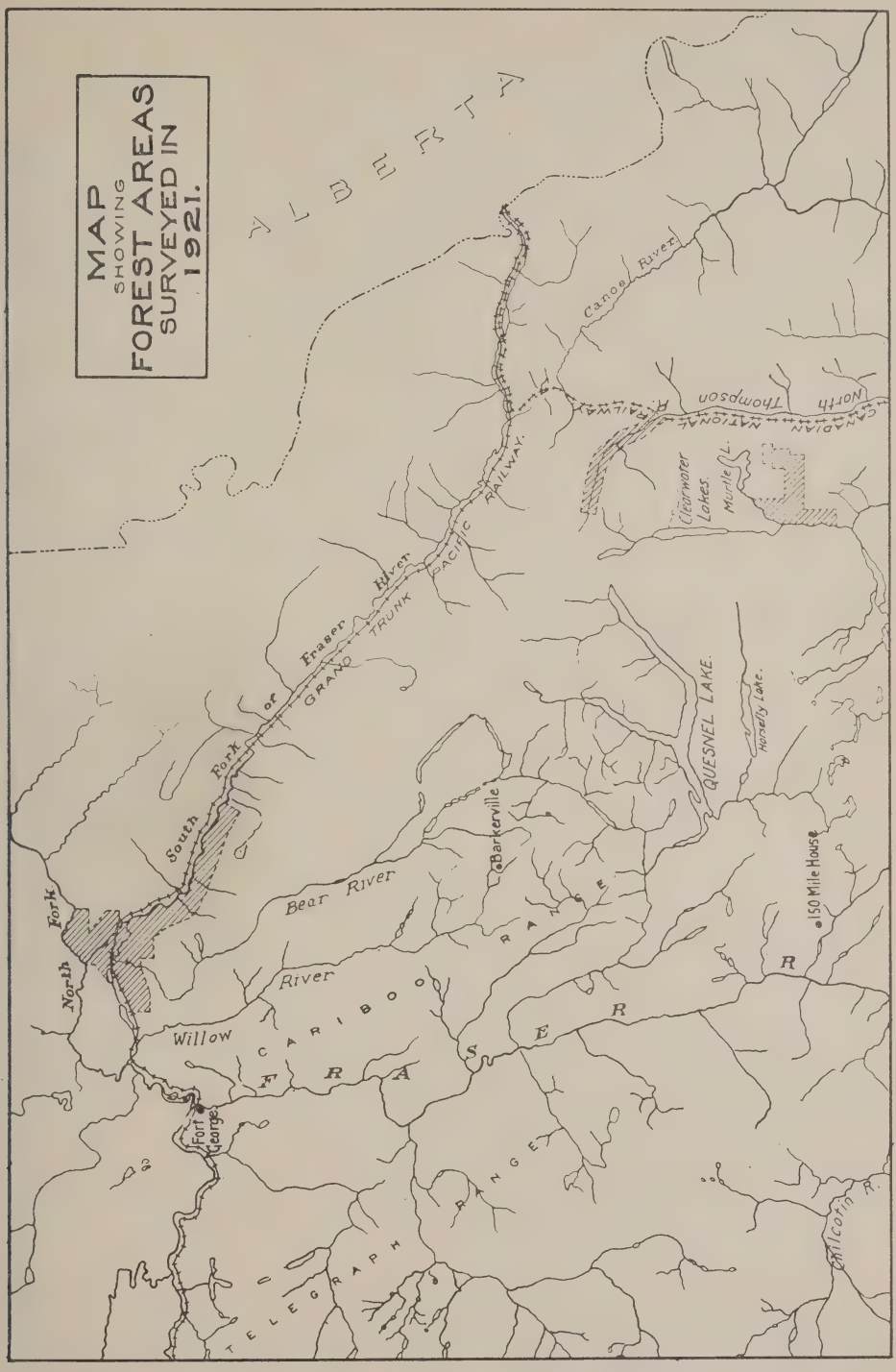
FOREST RECONNAISSANCE.

During the summer of 1921 six areas were covered with intensive reconnaissance and two areas with extensive reconnaissance. Areas covered by intensive reconnaissance were cruised and not less than 5 per cent. of the trees measured. A careful topographic map was prepared in each case. In extensive reconnaissance an area is covered only in a general way and a rough estimate of the general amount of timber obtained.

THE UPPER FRASER VALLEY.

Late in 1920 an application was received for a thirty-year supply of pulp-wood for a 100-ton sulphite plant to be located in the vicinity of Prince George. The cruise was proceeded with early in the year and a total of over 2,000,000 cords, averaging 85 per cent. spruce and 15 per cent. balsam, was estimated on an area of 167,000 acres. Of the spruce, 75 per cent. of the total volume is contained in logs 9-inch top diameter and over, and 25 per cent. in logs less than 9-inch top. The timber lies entirely within the valleys of the Fraser and Bowron Rivers, to


MAP
SHOWING
FOREST AREAS
SURVEYED IN
1921.
BABINE RANGE
Hazelton
Bulkley River
PACIFIC RAILWAY
PACIFIC RIVER
SKEENA
TRUNK
KITIMAT R.
Kitimat Arm
Portland Channel
Chatham Sd.
Kitlope L.
Gardner Canal
Swanson Bay
PORTLAND INLET
PRINCE RUPERT
PORCHER I.
PITT I.
BANKS I.
HECATE STRAIT
DIXON ENTRANCE
GRAHAM ISLAND
Masset Inlet
Queen Charlotte Is.


MAP
SHOWING
FOREST AREAS
SURVEYED IN
1921.
ALBERTA
Canoe River
North Thompson
CANADIAN NATIONAL RAILWAY
Clearwater Lakes
Murtle L.
PACIFIC RAILWAY
Fraser River
GRAND TRUNK
South Fork or
North Fork
Barkerville
QUESNEL LAKE
Horsefly Lake
Bear River
Willow River
CARIBOO RANGE
FRASER R.
150 Mile House
Fort George
TELEGRAPH RANGE
Chilcotin R.

which the timber is easily accessible, the average hauling distance being less than 2 miles. Weather conditions favour snow-logging and the Fraser, being easily drivable to Prince George, furnishes a ready means of transporting the logs to the mill. A considerable portion of the area was found to be adaptable for agricultural development after the timber has been removed.

The Kitimat Area.

An investigation was also made into the timber resources on Crown land in the Kitimat Valley and subsidiary valleys tributary to it. The valley drains by way of Kitimat River into Kitimat Arm, at the extreme head of Douglas Channel; it extends northward approximately 20 miles, a low divide of 600 feet separating it from the Lakelse Lake drainage-basin. The width of the valley averages 3 to 4 miles, being bounded on the east by the Coast Range proper and on the west by outlying spurs of the same range. Three tributary rivers of importance enter the Kitimat—namely, the Clearwater, which joins the Kitimat 7 miles from its mouth, and the Little and Big Wedeenes, whose junctions are 3 and 4 miles respectively farther up. The topography of the valley proper is almost featureless, being unusually broad and flat for the Northern Coast region. The tributary valleys are narrow, with steep slopes, and the rivers confined to deep canyons in places. The slopes of the main valley and tributaries bear timber to as high as 1,200 feet above sea-level, but 600 feet is the average limit of merchantability.

Along with the cruising proper, data were secured for a map showing 100-foot contours; details were secured by use of the "topographic Abney level" and 2-chain "topographic tape" with trailer. These instruments, used for the first time, proved highly satisfactory and assured comparative accuracy of the topography. Merchantable types were classified according to site, as on the whole this was found to be the determining factor influencing the quality, density, and mixture of the stand.

An area of 22,000 acres was covered by the cruise and a total of 250,000,000 feet was found, 35 per cent. of which is hemlock, 34 per cent. balsam, 25 per cent. spruce, and 6 per cent. cedar. Of the 22,000 acres covered, 60 per cent. was found to bear merchantable timber and 40 per cent. were non-merchantable areas, principally muskeg. The estimate was prepared from volume tables quoted later in this report, made by members of the party during the summer, and opportunities were thereby afforded the estimators of comparing their judgment with actual measurement of representative trees.

Logging by railroad is the most obvious method of extracting the timber, as there is a very easy grade up the entire west side of the river and preparation of a road-bed would be a simple matter.

Nass River Area.

In 1914 a preliminary reconnaissance was made of the Nass Valley. During the year 1921 this preliminary investigation was followed up with a more intensive cruise, covering about 31,000 acres. The Nass River is similar to the Skeena River and the Fraser River, in that its headwaters are east of the Coast range of mountains and the river itself breaks through the Coast Range on its way to the sea. The timber stands, therefore, are in two distinct types: (*a*) The Coast type; and (*b*) the Interior type, east of where the river breaks through the Coast Range. All of the main bodies of commercial timber on the Coast side of the range were cruised during the past summer and a start was made in the Interior region. The area covered in the upper valley above Ayansh contained 20,000 acres lying on the west side of the Nass River between the Quinetahl River and the Kinskooch River.

The total amount of timber found during this year's work on the Nass River was 311,000,000 feet, being 32 per cent. spruce, 13 per cent. balsam, 50 per cent. hemlock, and the remaining 5 per cent. lodge-pole pine and cedar. Adverse weather conditions made it impossible to complete the reconnaissance during the present season.

North Thompson River Area.

Work was started late in 1920 on a cruise of the timber on the North Thompson River above its junction with the Albreda River. The work was discontinued because of the inclemency of the weather during the late fall, and was completed during 1921. The North Thompson River flows east through a timbered valley averaging about half a mile in width. The hills on either side of the valley are steep, but covered with timber to an elevation of approximately 4,000 feet above sea-level. The valley has a very heavy precipitation for the Interior and a heavy snowfall

during winter. There is practically no agricultural land in the valley. Thunder Basin, located 24 miles above Thompson's Crossing, is about the limit for saw-timber. Above that point the timber is spruce and balsam of pulp quality. In the bottom lands a good stand of spruce and balsam is found, while on the slopes hemlock and cedar come into the mixture and the balsam drops out. The total area of merchantable timber on the North Thompson River covered by the survey was found to be 10,110 acres. A total stand of 193,000,000 feet was found on this area, consisting of 40 per cent. spruce, 40 per cent. cedar, 10 per cent. hemlock, and 5 per cent. each of fir and balsam.

The area is particularly well adapted to summer logging. The logs may be skidded with horses to chutes, and from that into the river and driven down the river to a mill below.

The Clearwater Area.

The Clearwater reconnaissance during the past summer covered two distinct areas: (*a*) The east side of the valley proper lying between the mouth of the Clearwater River and the upper reaches of the Myrtle River; and (*b*) an unsurveyed area covered with a stand of pulp-timber lying to the east of the Clearwater River and south of Myrtle Lake and at an elevation of some 3,000 feet above the valley proper.

The Clearwater River is young in geological time and is overlooked by rocky cliffs and precipitous slopes 500 to 1,000 feet in height. The valley proper lies about 1,000 feet above and to the east of the Clearwater River. It has its greatest width near its junction with the Myrtle River, and narrows and finally disappears entirely in a box canyon about 12 miles from its mouth. To the east of the valley the hills rise steeply.

The valley lands have been mostly burned over and the original stand destroyed or badly thinned out. An excellent stand of reproduction is replacing the stand burned, over practically the whole of the valley. An area of less than 25,000 acres of merchantable timber was found in 58,000 acres of the valley investigated, containing a stand of 242,000,000 feet, of which 40 per cent. is Douglas fir, 35 per cent. cedar, 14 per cent. spruce, and some hemlock and lodge-pole pine. It is estimated that approximately 20,000 acres of the valley is suitable for agriculture when cleared. The remainder is rocky and steep.

Only 23,000 acres of an estimated area of 140 square miles was cruised in the spruce and balsam area during 1921. The stand, averaging 8,500 feet B.M. per acre, lies at an elevation of 5,000 feet above sea-level, on the headwaters of small tributaries of the Clearwater River and Myrtle Lake. The topography is rolling and plateau-like, and the various small streams, separated by low divides, converge towards the valley below, joining, while still at a high elevation, into one stream before entering Myrtle Lake. The stand is 65 per cent. spruce, 30 per cent. balsam, and the remaining 5 per cent. cedar and lodge-pole pine.

Only a relatively small proportion of the Clearwater Valley watershed was covered during the past summer. Due to weather conditions it was necessary to abandon the work in the early fall.

Masset Inlet Area.

During the past summer an area of 32,000 acres lying north and east of Masset Inlet, on Queen Charlotte Islands, was investigated. Of this area less than 8,000 acres was found to be covered with a stand of merchantable timber. The remainder of the area is covered with a scrub stand of defective spruce and hemlock and a very large percentage of the area is muskeg. A stand of 67,000,000 feet was found on the merchantable area, 55 per cent. of which was cedar, 30 per cent. balsam, and 15 per cent. spruce.

The country in general is rolling, with small creeks flowing out of muskegs and into Masset Inlet. Along the streams there is usually a narrow strip of merchantable timber. Farther back the land is muskeg and the ridges have been burned, leaving a scrub stand of timber unfit for commercial use.

Tahtsa Lake Reconnaissance.

Co-operating with a topographic survey party under the direction of F. C. Swannell, B.C.L.S., an extensive reconnaissance was made of the timber land surrounding Tahtsa Lake, which lies in a deep mountain valley on the eastern edge of the Coast Range. It receives its waters from glacier-fed rivers and creeks, none of which are very long, and then drains by way of Tahtsa River into Ootsa Lake. The area is very mountainous and all the merchantable timber is found

on the lower slopes near the lake-shore. The major blocks of timber lie chiefly near the broad delta-mouths of the larger creek-valleys and extend up these valleys for about a mile.

A stand of 67,000,000 feet on an area of 8,000 acres was found tributary to Tahtsa Lake. The timber is hemlock and balsam, the best stands being, roughly, 60 per cent. balsam and 40 per cent. hemlock.

KITLOBE RIVER AND LAKE RECONNAISSANCE.

During the survey of the Kitlobe River and Lake region a reconnaissance of the timber resources of that area was made after the same fashion as explained above on the Tahtsa Lake area. The Kitlobe Lake and River drain into the head of Gardner Canal, which has very steep mountains sloping down to the water, bare of merchantable timber. Kitlobe Lake, located 8 miles above the head of Gardner Canal, is 8 miles long and three-quarters of a mile wide and is only 30 feet above sea-level. Except for its northern and southern end, it is walled with precipitous mountains and little merchantable timber is to be found along its shores.

All of the branches of the Kitlobe River receive their waters from glaciers, and the whole district is a rugged mountainous one, with numerous glacier-capped peaks. Along the 8 miles of valley between Gardner Canal and Kitlobe Lake the merchantable timber is scattered. A great part of the flat land along the river-banks is swampy and covered with alder, although there are some large spruce-trees to be found.

The largest area of timber is near the junction of Kitlobe River and Kitlobe Lake. Here the valley widens considerably and a fairly heavy stand of spruce and hemlock is found, running about 15,000 feet per acre. Farther up the Kitlobe River there are other small isolated blocks of timber of a quality and quantity to warrant exploitation at some future date.

GROWTH STUDIES.

Studies of forest-growth were undertaken during the past summer in the Kitimat Valley in connection with the cruising-work which was being carried on. It was proposed to find out, if possible, if the annual growth in this valley was sufficient to supply, continuously, the raw material for a pulp-mill, and, if so, the size of mill which this increment would supply. For the purpose of study the following timber types were recognized: River-bottom, low bench, side-hill, and upper bench.

RIVER-BOTTOM.

This includes the area subject to flooding. Spruce predominates and in cases is represented by isolated veterans among a dense growth of devil's-club. The stand is overmature and badly affected by fungi.

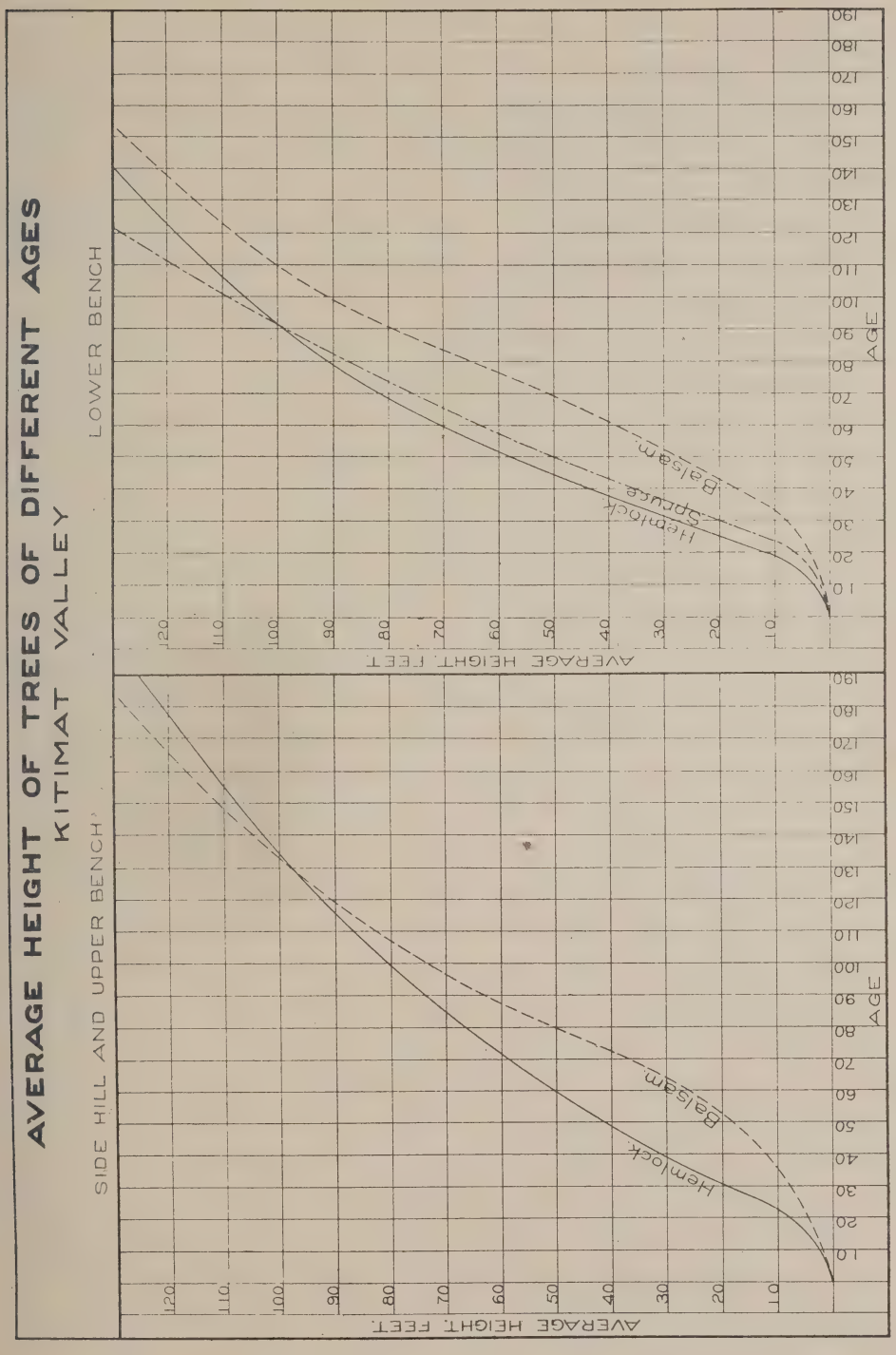
There is very little spruce reproduction except on the margins of sand-bars. The indications are that the area, where spruce predominates in the mature stand, has gone through the evolution of sand-bar to river-bottom, and the present stand was reproduced in the early stages. The study carried on would show that a satisfactory crop of spruce from natural reproduction will be difficult to obtain after logging, due to the density of the shrub undergrowth which grows in all openings in the stands.

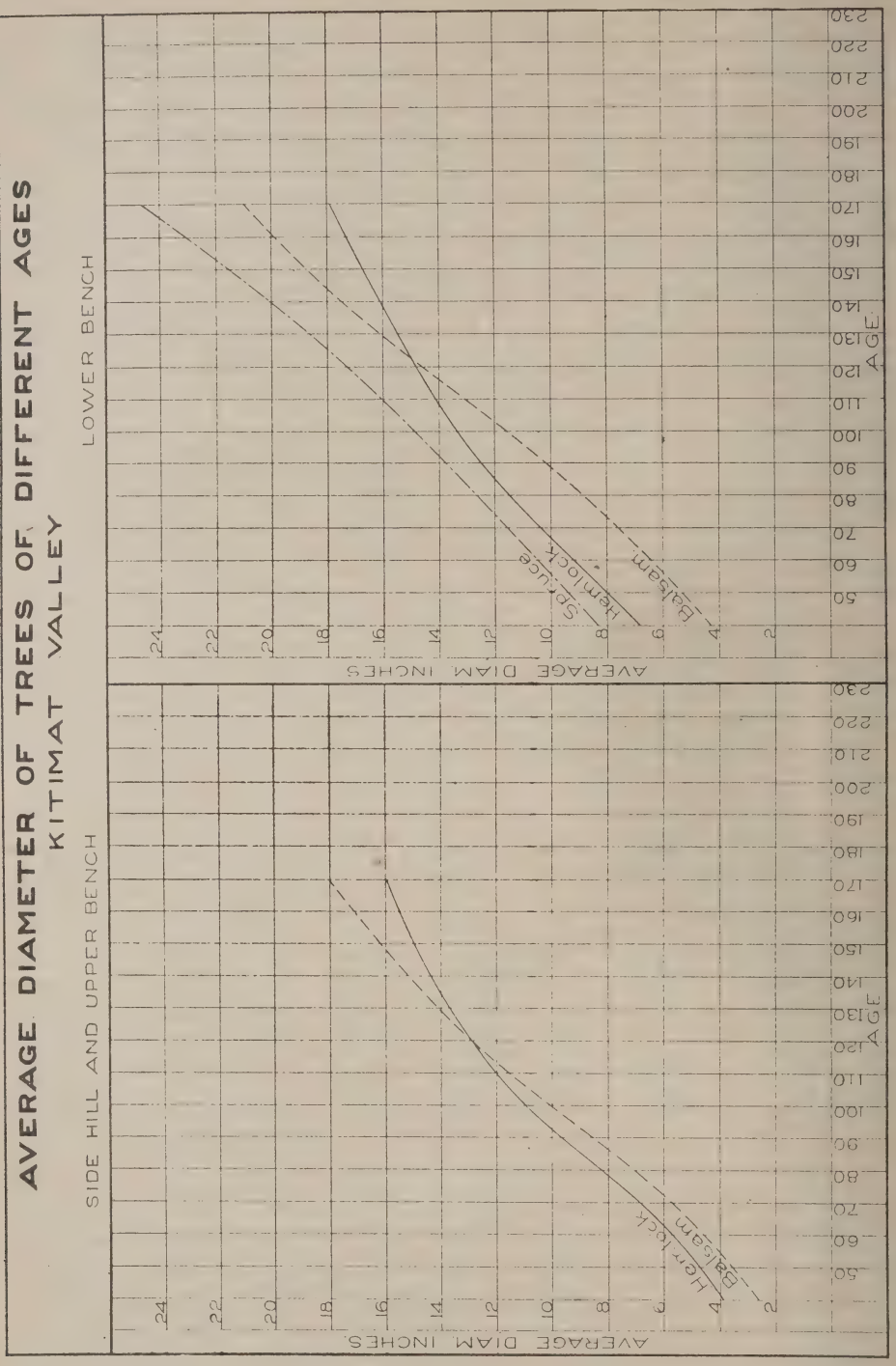
Test borings with the increment borer on a large number of trees show that the annual increment in this type is over 400 board-feet per acre.

LOW BENCH.

This includes the flat plain stretching back from the river, but not subject to flooding. The soil is a sandy loam, deep, fresh over gravel, and supports an under-story of devil's-club and blue-berries. Balsam and hemlock predominate, with occasional large spruce in the moister places. All species are badly affected by fungi and the hemlock by mistletoe. Reproduction of balsam and hemlock is rapid. Balsam comes in under the old hemlock stand. Clear cutting of all species except spruce, to remove the diseased and suppressed trees and the favouring of spruce during the cutting of the stand, should later result in an increase of the percentage of spruce in the reproduction.

The yield table on page 25 is empirical.


AVERAGE HEIGHT OF TREES OF DIFFERENT AGES
KITIMAT VALLEY
SIDE HILL AND UPPER BENCH
LOWER BENCH
AVERAGE HEIGHT FEET
AGE
Hemlock
Spruce
Balsam


AVERAGE DIAMETER OF TREES OF DIFFERENT AGES
KITIMAT VALLEY
LOWER BENCH
SIDE HILL AND UPPER BENCH
AVERAGE DIAM INCHES
AGE
Balsam
Hemlock
Spruce
Balsam
Hemlock

Yield Table per Acre, Low Bench, Kitimat Valley.

Age.	Hemlock.			Balsam.			Spruce.			Cedar.*			All Species.			
	Average D.B.H.	No. of Trees.	Volume B.M.	Average D.B.H.	No. of Trees.	Volume B.M.	Average D.B.H.	No. of Trees.	Volume B.M.	Average D.B.H.	No. of Trees.	Volume B.M.	No. of Trees.	Volume B.M.	Mean Annual Increment.	Age.
100	13.4	45	7,040	11.5	33	3,300	14.9	12	2,480	15.2	6	360	96	13,180	132	100
110	14.0	41	7,994	13.0	30	4,266	16.1	11	2,675	17.2	5	693	87	15,628	140	110
120	14.7	38	8,435	14.6	28	5,625	17.3	10	2,800	19.3	5	906	81	17,766	148	120
130	15.4	35	8,640	16.1	25	6,336	18.6	10	3,120	21.4	5	1,095	75	19,191	148	130
140	16.0	32	8,497	17.5	23	6,980	20.0	9	3,240	23.3	4	1,096	68	19,813	141	140
150	16.6	29	8,240	18.7	21	7,200	21.5	8	3,370	25.7	3	1,218	61	20,028	134	150

The annual increment as shown by the increment borer is 179 feet board measure per acre.

* The growth for cedar is compiled from data gathered in 1920 in Roscoe Inlet, probably under considerably different growth conditions from that of the Kitimat Valley and on much fewer trees than the growth for hemlock, balsam, and spruce.

Side-hill and Upper Benches.

These types include the slope and benches above the river plains. The soil is mostly deep and fresh and overlies gravel. The present stands are even-aged. A large per cent. has been burned over in the last 200 years, although no recent burns were found. The stands with south exposure are of better quality than those on the north. Balsam and hemlock predominate, with occasional spruce and cedar. Fungous disease is prevalent and the hemlock very badly affected by mistletoe. Balsam and hemlock reproduction is rapid. Balsam has suffered more than hemlock from suppression in the early stages. Very dense hemlock reproduction follows burns; balsam follows blow-downs. On account of the prevalence of disease, the soil-protection afforded by the undergrowth, the liability to windfall, and the rapidity of reproduction, clear cutting of all species would be advisable, and broadcast burning is desirable to combat the disease and to kill off the useless suppressed reproduction at present in the stand.

Yield Table, Side-hill and Upper Bench.

Age.	Hemlock.			Balsam.			All Species.			
	Average D.B.H.	No. of Trees.	Volume B.M.	Average D.B.H.	No. of Trees.	Volume B.M.	No. of Trees.	Volume B.M.	Mean Annual Increment.	Age.
100	11.0	97	8,300	10.3	98	6,200	195	14,500	145	100
110	12.0	79	8,930	11.4	69	6,730	148	15,660	142	110
120	13.0	57	8,130	12.6	54	6,950	111	15,080	124	120
130	13.7	47	7,290	13.8	38	7,010	85	14,300	110	130
140	14.4	37	6,960	15.0	31	7,060	68	14,020	101	140
150	15.0	32	6,680	16.2	25	7,110	57	13,790	92	150

The annual increment as shown by borings on a number of trees is 133 board-feet per acre.

Methods of Study.

Sample plots of ½ to 1 acre were laid off and all trees on them carefully measured. As no volume tables for the district were available, tables had to be made locally in the Kitimat Valley and they were applied to the sample plots later. The average diameter breast-high of the trees in each plot was determined and a tree of that diameter was felled and complete stem analysis was made. From this was determined the age of the average tree, which was taken as the average age of the stand. The ages of the different species checked very closely. From this data the yield tables quoted above were prepared.

To find the growth per cent. of these stands, borings were taken in every merchantable tree on the sample plot, and the growth per cent. computed by Schnieder's formula and applied to the average acre. This growth per acre does not take into consideration loss from natural agencies, such as decay and blow-down, and presumes that the trees will keep on increasing in the future as they have in the past. This method therefore only serves as a check on the yield expressed in the tables.

VOLUME TABLES.

The volume tables were compiled by the same party which made the growth studies in the Kitimat Valley for hemlock, balsam, and spruce, and these tables are quoted below. The measurements were obtained from windfalls collected from all types and sites in the valley.

WESTERN HEMLOCK, KITIMAT VALLEY.

Based on measurements of windfalls, 2.5-foot stump, 32-foot logs, and B.C. Rule.

D.B.H.	1.	1½.	2.	2½.	3.	3½.	4.	4½.	Top D.I.B.	Basis.
10	65	....	....	....	....	....	....	....	7.6	4
12	70	135	200	....	....	....	....	....	7.9	9
14	75	155	230	310	....	....	....	....	8.2	11
16	85	175	270	360	....	....	....	....	8.5	19
18	95	205	315	430	520	....	....	....	8.8	16
20	105	235	370	500	630	....	....	....	9.2	26
22	....	265	420	580	730	890	....	....	9.5	19
24	....	295	480	660	850	1,030	....	....	9.9	17
26	....	....	530	740	960	1,170	1,390	....	10.3	11
28	....	....	590	830	1,070	1,310	1,560	....	10.6	19
30	....	....	660	930	1,200	1,460	1,730	....	11.0	8
32	....	....	....	1,020	1,320	1,620	1,920	....	11.3	11
34	....	....	....	1,110	1,440	1,770	2,100	2,440	11.6	6
36	....	....	....	1,200	1,550	1,910	2,270	2,620	12.0	10
38	....	....	....	1,280	1,660	2,040	2,410	2,790	12.2	6
40	....	....	....	1,360	1,770	2,180	2,600	3,010	12.4	6
42	....	....	....	....	1,890	2,350	2,800	3,240	12.6	4
44	....	....	....	....	2,010	2,500	2,980	3,470	12.8	5
46	....	....	....	....	2,140	2,640	3,150	3,660	13.1	4
48	....	....	....	....	2,270	2,800	3,320	3,830	13.4	2
Basis	18	18	47	40	42	30	19	1	....	215

The above table was compiled by frustrum form factor method.

SITKA SPRUCE, KITIMAT VALLEY.

Based on 2.5-foot stump, 32-foot logs, and B.C. Rule.

D.B.H.	1.	1½.	2.	2½.	3.	3½	4.	4½.	5.	5½.	No. of Trees.	Top D.I.B.
8	50	....	....	....	....	....	....	....	....	....	..	7.2
10	55	110	....	....	....	....	....	....	....	....	1	7.5
12	60	125	185	....	....	....	....	....	....	....	..	7.8
14	65	140	215	....	....	....	....	....	....	....	3	8.2
16	75	170	265	360	....	....	....	....	....	....	3	8.5
18	85	200	320	430	....	....	....	....	....	....	5	8.8
20	95	230	365	500	640	....	....	....	....	....	4	9.2
22	..	....	405	570	735	900	....	....	....	....	3	9.5
24	..	....	470	660	850	1,040	....	....	....	....	6	9.9
26	..	....	530	750	965	1,180	....	....	....	....	4	10.2
28	..	....	600	840	1,080	1,330	1,570	....	....	....	8	10.6
30	..	....	690	960	1,230	1,500	1,770	....	....	....	4	11.0
32	..	....	....	1,060	1,360	1,670	1,980	2,290	....	....	5	11.3
34	..	....	....	1,160	1,495	1,830	2,175	2,520	....	....	9	11.6
36	..	....	....	1,270	1,645	2,010	2,415	2,800	....	....	5	12.0
38	..	....	....	1,380	1,795	2,215	2,635	3,055	....	....	6	12.3
40	..	....	....	1,510	1,960	2,410	2,860	3,320	3,780	....	2	12.6
42	..	....	....	....	2,120	2,615	3,100	3,600	4,090	....	8	12.8
44	..	....	....	....	2,275	2,810	3,350	3,890	4,425	....	5	13.1
46	..	....	....	....	....	3,020	3,610	4,200	4,790	5,385	6	13.4
48	..	....	....	....	....	3,230	3,850	4,465	5,100	5,725	4	13.6
50	..	....	....	....	....	....	4,100	4,735	5,400	6,080	2	13.8
52	..	....	....	....	....	....	4,325	5,050	5,750	6,460	2	14.1
54	..	....	....	....	....	....	4,550	5,325	6,100	6,880	5	14.3
56	..	....	....	....	....	....	....	5,650	6,450	7,240	2	14.5
58	..	....	....	....	....	....	....	5,925	6,810	7,650	3	14.7
60	..	....	....	....	....	....	....	6,275	7,160	8,040	3	15.0
62	..	....	....	....	....	....	....	....	7,520	8,580	3	15.2
64	..	....	....	....	....	....	....	....	7,870	8,860	2	15.4
66	..	....	....	....	....	....	....	....	8,210	9,270	1	15.6
68	..	....	....	....	....	....	....	....	8,600	9,690	..	15.7
70	..	....	....	....	....	....	....	....	8,960	10,070	..	15.9
	3	....	13	7	15	29	15	17	9	6	114	

The above table was compiled by frustrum form factor method.

BALSAM (ABIES AMABILIS), KITIMAT VALLEY.

Based on measurements of windfalls, 2.5-foot stumps, 32-foot logs, and B.C. Rule.

D.B.H.	1.	1½.	2.	2½.	3.	3½.	4.	4½.	Top D.I.B.	Basis.
10	55	125	.....	.....	.....	.....	.....	.....	7.8	5
12	65	140	.....	.....	.....	.....	.....	.....	8.0	14
14	80	155	230	.....	.....	.....	.....	.....	8.3	15
16	100	175	270	370	.....	.....	.....	.....	8.5	21
18	110	205	315	435	.....	.....	.....	.....	8.9	27
20	.....	235	365	500	630	.....	.....	.....	9.1	24
22	.....	270	420	570	730	.....	.....	.....	9.4	25
24	.....	.....	470	655	840	1,030	.....	.....	9.7	22
26	.....	.....	.....	740	960	1,185	1,400	.....	10.0	16
28	.....	.....	.....	860	1,100	1,345	1,590	.....	10.3	8
30	.....	.....	.....	1,000	1,260	1,535	1,810	.....	10.7	7
32	.....	.....	.....	1,160	1,460	1,760	2,060	2,360	11.1	14
34	.....	.....	.....	.....	1,660	2,040	2,430	2,820	11.6	10
36	.....	.....	.....	.....	1,870	2,260	2,770	3,170	12.1	8
38	.....	.....	.....	.....	2,080	2,510	2,990	3,470	12.6	5
40	.....	.....	.....	.....	.....	2,740	3,170	3,600	13.2	1
Basis	14	22	41	51	46	29	18	1	.....	222

The above table was compiled by the conventional method.

PRINCE GEORGE VOLUME TABLES.

There has been a great need for a volume table for spruce for use in the Prince George District. Previous tables for this locality have been constructed for estimating in board measure only, and in view of the possible pulp development it was considered that trees might be utilized for pulp-wood to a smaller top diameter than it was customary when put through the sawmill; therefore a table was compiled showing the volume in board-foot measure to the customary point of utilization plus the volume of the merchantable portion of the remaining top in solid cubic feet. Measurements from which the tables were compiled were collected from felled trees in the district. The trees were separated into diameters and 16-foot log-length classes. A taper curve was then constructed for each diameter and log-length class, the curves scaled off in log-lengths, and the total volume of the tree computed from the B.C. Log Scale. The volumes were then replotted for each log-length class according to volume based on diameter, and from this set of curves the final tables were read. From the same taper curves scaled off in 4-foot lengths cubic volume of the merchantable length was computed. After evening up these volumes as explained above, the final volumes were read off as shown in the volume table for solid cubic feet.

White Spruce (Engelmann).

Volume table for Upper Fraser Valley in board-feet by 1-inch classes and log-lengths to D.I.B. 6 to 8 inches as shown, plus volume in solid cubic feet contained in remainder of stem. Based on measurements of 392 felled trees in vicinity of Hutton and Aleza Lake. Stump-height, 2.5 feet. Logs, 16 feet.

D.B.H.	Cu. Ft.	1 Log.		1½ Logs.		2 Logs.		2½ Logs.		3 Logs.		3½ Logs.		4 Logs.		4½ Logs.		5 Logs.		5½ Logs.		6 Logs.		Top D.I.B.		No. of Trees.	Average.		
		B.F.	C.F.	B.F.	C.F.	B.F.	C.F.	B.F.	C.F.	B.F.	C.F.	B.F.	C.F.	B.F.	C.F.	B.F.	C.F.	B.F.	C.F.	B.F.	C.F.	B.F.	C.F.	B.F.	C.F.		No. Logs.	B.F.	C.F.
6	4.0	....	....	20	1.0	....	....	.....	.....	.....	....	.....	....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....	6.0	4.0	.....	.....	.....	4.0
7	....	15	2.5	30	1.2	....	....	.....	.....	.....	....	.....	....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....	6.0	4.0	.....	1	20	1.3
8	....	20	3.0	35	1.4	....	....	.....	.....	.....	....	.....	....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....	6.0	4.0	.....	1	30	1.5
9	....	....	....	....	....	40	1.2	55	1.1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6.1	4.1	2	2	50	1.6
10	....	....	....	....	....	50	1.7	65	1.4	85	1.1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6.2	4.2	9	2½	65	1.7
11	....	....	....	....	....	60	2.2	80	1.7	100	1.6	120	1.3	135	1.0	.....	.....	.....	.....	.....	.....	.....	.....	6.3	4.3	23	2½	90	1.8
12	....	....	....	....	....	....	....	90	1.9	115	2.0	135	1.6	150	1.3	185	1.0	.....	.....	.....	.....	.....	.....	6.4	4.4	21	3	115	1.9
13	....	....	....	....	....	....	....	....	.....	130	2.5	150	2.0	170	1.6	205	1.2	.....	.....	.....	.....	.....	.....	6.5	4.5	40	3½	140	2.0
14	....	....	....	....	....	....	....	....	.....	145	2.9	165	2.4	190	1.9	230	1.4	.....	.....	.....	.....	.....	.....	6.6	4.6	32	3½	170	2.1
15	....	....	....	....	....	....	....	....	.....	155	3.4	185	2.8	215	2.2	255	1.6	290	1.0	.....	.....	.....	.....	6.7	4.7	40	4	200	2.2
16	....	....	....	....	....	....	....	....	.....	170	3.8	205	3.2	235	2.5	280	1.8	315	1.2	.....	.....	.....	.....	6.8	4.8	36	4	235	2.2
17	....	....	....	....	....	....	....	....	.....	185	4.2	220	3.5	260	2.8	305	2.1	340	1.3	.....	.....	.....	.....	6.9	4.9	40	4	270	2.3
18	....	....	....	....	....	....	....	....	.....	200	4.7	240	3.9	280	3.1	330	2.3	370	1.5	.....	.....	.....	.....	7.0	5.0	37	4	300	2.3
19	....	....	....	....	....	....	....	....	.....	215	5.1	260	4.2	305	3.4	355	2.5	400	1.6	.....	.....	.....	.....	7.1	5.1	35	4½	345	2.4
20	....	....	....	....	....	....	....	....	.....	230	5.6	280	4.6	335	3.7	380	2.8	425	1.8	515	1.5	.....	.....	7.2	5.2	16	5	390	2.4
21	....	....	....	....	....	....	....	....	.....	.....	.....	300	5.0	360	4.0	410	3.0	455	1.9	545	1.6	.....	.....	7.3	5.3	15	5	435	2.5
22	....	....	....	....	....	....	....	....	.....	.....	.....	320	5.4	385	4.3	435	3.2	490	2.1	570	1.8	.....	.....	7.4	5.4	8	5	485	2.5
23	....	....	....	....	....	....	....	....	.....	.....	.....	.....	.....	410	4.6	465	3.4	520	2.2	600	1.9	.....	.....	7.5	5.5	9	5	535	2.5
24	....	....	....	....	....	....	....	....	.....	.....	.....	.....	.....	440	4.9	495	3.6	555	2.4	625	2.0	710	1.5	7.6	5.6	9	5	580	2.6
25	....	....	....	....	....	....	....	....	.....	.....	.....	.....	.....	470	5.1	525	3.8	590	2.6	655	2.1	730	1.5	7.7	5.7	8	5	625	2.6
26	....	....	....	....	....	....	....	....	.....	.....	.....	.....	.....	500	5.3	555	4.0	625	2.7	685	2.2	760	1.6	7.8	5.8	5	5	660	2.6
27	....	....	....	....	....	....	....	....	.....	.....	.....	.....	.....	530	5.5	585	4.2	660	2.9	720	2.3	805	1.6	7.9	5.9	5	5	695	2.6
28	....	....	....	....	....	....	....	....	.....	.....	.....	.....	.....	560	5.7	615	4.4	695	3.1	755	2.4	870	1.7	8.0	6.0	2	5	730	2.7
29	....	....	....	....	....	....	....	....	.....	.....	.....	.....	.....	590	5.9	645	4.6	725	3.3	790	2.6	930	1.7	8.0	6.0	.....	5	760	2.7
30	....	....	....	....	....	....	....	....	.....	.....	.....	.....	.....	620	6.0	675	4.8	760	3.5	825	2.8	985	1.8	8.0	6.0	.....	5	790	2.7

Compiled by L. S. Hope, after measurements by McVickar.

White Spruce (Engelmann).

Volume table for the Upper Fraser Valley in solid cubic feet based on measurements of 392 felled trees in the vicinity of Hutton and Aleza Lake. Stump-height, 2.5 feet; 16-foot logs and half-logs. Log-lengths to same D.I.B. as for Board-foot Table for ease in cruising, but volumes computed to D.I.B. shown below.

D.B.H., Inches.		2 Logs.	2½ Logs.	3 Logs.	3½ Logs.	4 Logs.	4½ Logs.	5 Logs.	5½ Logs.	6 Logs.	Top D.I.B., Inches.	No. of Trees.	Average.	
													Cu. Ft.	Logs.
6	4.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	4.0	.....	4.0	.....
7	5.8	.....	.....	.....	.....	.....	.....	.....	.....	.....	4.0	.....	6.0	.....
8	9.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	4.0	.....	9.0	.....
9	.....	11.0	.....	.....	.....	.....	.....	.....	.....	.....	4.1	2	12.0	2.0
10	.....	13.0	15.0	17.5	.....	.....	.....	.....	.....	.....	4.2	9	15.5	2.5
11	.....	15.0	17.5	20.5	.....	.....	.....	.....	.....	.....	4.3	23	20.0	2.5
12	.....	17.0	20.0	24.0	27.0	30.0	.....	.....	.....	.....	4.4	21	25.0	3.0
13	.....	.....	22.0	27.0	30.5	34.0	.....	.....	.....	.....	4.5	40	30.0	3.5
14	.....	.....	24.5	30.0	34.0	38.0	.....	.....	.....	.....	4.6	32	35.5	3.5
15	.....	.....	27.0	33.0	38.0	42.0	47.0	52.0	.....	.....	4.7	40	41.0	4.0
16	.....	.....	.....	36.5	41.0	47.0	52.0	57.0	.....	.....	4.8	36	47.0	4.0
17	.....	.....	.....	40.0	45.0	51.0	57.0	63.0	.....	.....	4.9	40	53.0	4.0
18	.....	.....	.....	43.0	49.0	55.0	62.0	69.0	.....	.....	5.0	37	59.0	4.0
19	.....	.....	.....	.....	52.0	59.0	67.0	74.0	.....	.....	5.1	35	66.0	4.5
20	.....	.....	.....	.....	56.0	64.0	72.0	80.0	.....	.....	5.2	16	72.0	5.0
21	.....	.....	.....	.....	59.0	68.0	76.0	86.0	90.0	.....	5.3	15	81.5	5.0
22	.....	.....	.....	.....	63.0	72.0	81.0	91.0	97.0	103.0	5.4	8	90.0	5.0
23	.....	.....	.....	.....	.....	76.0	86.0	97.0	104.0	111.0	5.5	9	98.0	5.0
24	.....	.....	.....	.....	.....	81.0	91.0	103.0	111.0	119.0	5.6	9	106.0	5.0
25	.....	.....	.....	.....	.....	86.0	96.0	109.0	118.0	127.0	5.7	8	114.0	5.0
26	.....	.....	.....	.....	.....	91.0	101.0	114.0	125.0	135.0	5.8	5	121.0	5.0
27	.....	.....	.....	.....	.....	96.0	107.0	120.0	132.0	144.0	5.9	5	127.0	5.0
28	.....	.....	.....	.....	.....	102.0	112.0	126.0	139.0	151.0	6.0	2	132.0	5.0
29	.....	.....	.....	.....	.....	108.0	118.0	132.0	146.0	158.0	6.0	.....	137.0	5.0
30	.....	.....	.....	.....	.....	115.0	125.0	138.0	153.0	165.0	6.0	.....	141.0	5.0

Compiled by L. S. Hope, after measurements by McVickar.

SAMPLE PLOT AND REGENERATION STUDY.

It is very important, if we are to build up a technique for proper forest management in the widely different forest conditions of the Province, that investigations of systematic character and conducted with scientific accuracy form an important part of the work of the service. At the present time, as we are severely handicapped by lack of reliable information based on experience, it is considered advisable to establish permanent sample plots which will be intensively studied, periodically, over a term of years. The studies which will be carried out on these sample plots might be classified as follows: Reproduction studies, growth and yield studies, and thinning effects on remaining stands. During the past year twenty-five sample plots with these objects in view were established in different parts of the Province.

The ultimate aim in following out all of these investigations is to introduce a workable sylvicultural policy to be applied to the logging of Crown lands. Such a policy to be of any value, and at the same time to be feasible under present conditions or conditions likely to prevail in the immediate future, must meet the following requirements:—

(1.) It must ensure an adequate reproduction.

(2.) It must not be so costly as to make logging unprofitable.

(3.) It should as far as possible encourage the regeneration of the most valuable species.

On the Lower Coast a start was also made in the study of seed-dissemination with a view to finding the total and effective radius of seed-distribution in various species. One condition of such a study is that the area must have been burned with sufficient intensity to destroy all seed in the litter, so that all reproduction obviously will have originated from the seed-tree in question. It was difficult to find such situations. The only species studied was Douglas fir. Lines were run in the four cardinal directions from the seed-trees which stood in the open, and at intervals of 1 chain along these lines square-rod seedling plots were taken. As a result of these it was found that the maximum radius of seed-dissemination from a 175-foot fir was 325 feet in the direction against the prevailing wind, 525 feet with the prevailing wind, and 400 feet to right and left of the line of the prevailing wind, giving an oval plot of approximately 13 acres. The effective radius, however, of seeding was found to be only about 300 feet. Beyond this distance the seedlings were found to be too sparse to ensure a fully stocked stand.

THE CONTROL OF FOREST INSECTS.

The fight against the forest insects which have caused tremendous loss in the yellow-pine region of Vernon District, and which has called for drastic measures to prevent further loss, was continued during 1921. When the infestation has been found on Crown land the measures for control have been financed by the Provincial Government.

The work consists of three phases: (1.) Timber-sales of infested areas where the timber is cut under special rules and regulations; (2.) Direct-control work where the trees are felled, peeled, and the bark and slash burned on the spot; (3.) Prevention of the multiplication of the bark-beetles that are causing the damage by burning all slash and cull logs in the district.

Two large areas have been subject to these epidemics—one in the Princeton region, where from 40 to 90 per cent. of the standing timber has been killed during the period from 1913 to 1919, and the epidemics around Merritt which began about 1917. It was to prevent a repetition of the Princeton loss that control operations were begun in 1920 in the Merritt region. The work has been carried on under the direction of Ralph Hopping, of the Division of Entomologists, Ottawa.

More or less epidemic conditions also exist in certain areas of Douglas fir, white pine, and lodge-pole pine. Direct-control work was this year begun around Adams Lake, where infested Douglas fir and white pine were found; 493 trees with a footage of approximately 34,000 feet were handled in this project.

Several epidemic areas existed in lodge-pole pine, but, as these are not in commercial timber, control measures are not at present prosecuted.

The work around Merritt during 1921 was handled on two separate areas. The largest infestation exists on Midday Creek and a smaller infestation is located on Voght Creek around Kingsvale. On Midday Creek the work consisted of recleaning the area worked in 1920 and extending this area to include further infected trees on the north-east side of the creek. It was found on going over the areas worked in 1920 that over 80 per cent. of the infestation had been destroyed in the first cleaning. Ordinarily it is expected that about 40 per cent. reinfestation will show the second year. The low rate of infestation was due not only to the thorough work done by the men in charge, but also to the policy of burning the slash and cull logs after they had become infested on the cut-over areas immediately adjoining. Some 1,010 trees having a volume of 188,000 feet board measure were destroyed in the direct control on the Midday area.

Work was begun on Voght Creek in the spring of 1921 under the name of Kingsvale area, where the largest part of the season's work was done, and the greater part of the infested trees were cut and burned. The infestation is killed in this area and will not return as an epidemic, providing a small amount of recleaning is done in 1922. A total of 2,840 yellow pine and 105 lodge-pole pines were cut and burned with a volume of 486,000 feet.

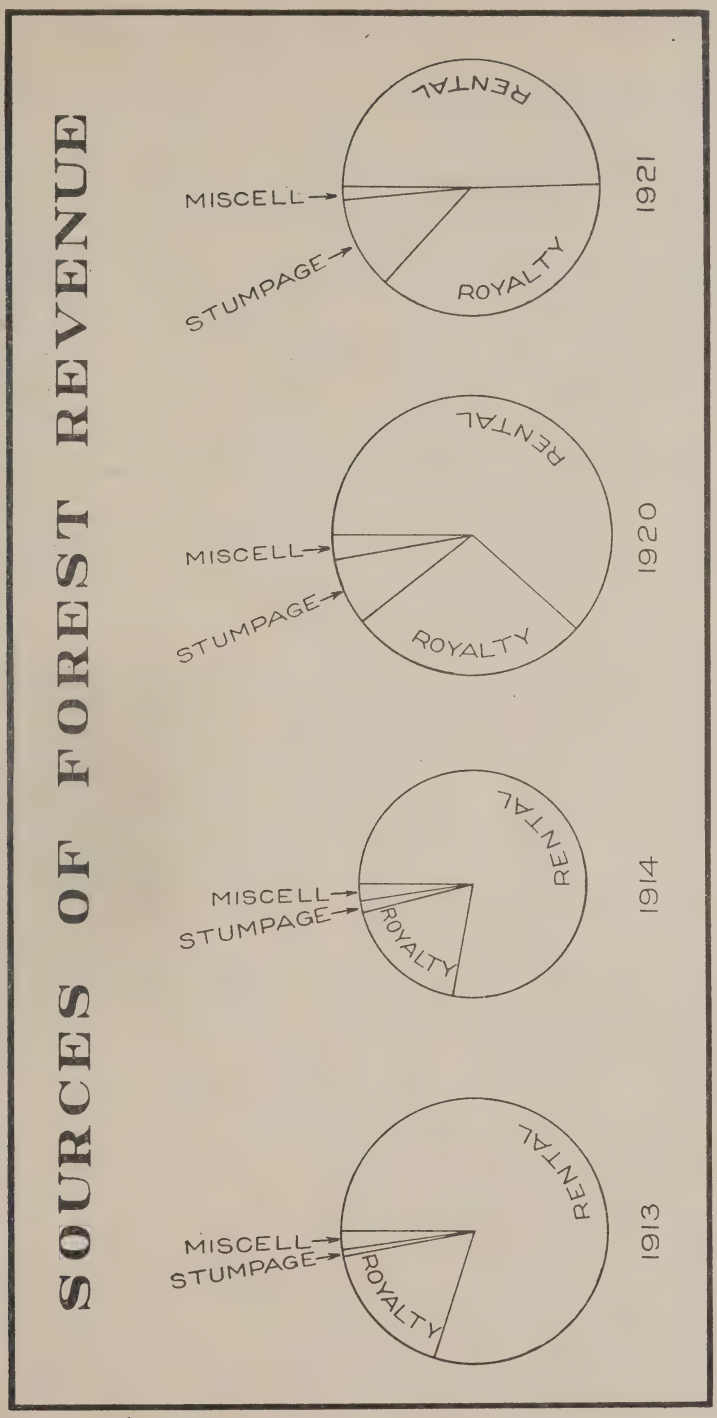
A total of 4,340 trees were felled, peeled, and the bark and slash burned, thus destroying all of the beetles, during 1921. These trees amounted to 708,000 feet, not including small trees under 8 inches, of which no record was kept.

FOREST RECORDS.

Forest Revenue.

Revenue from forests shows a decline of $507,493.67 over the previous calendar year; this decline is almost wholly due to decline in payment of timber-licence renewal fees and penalties on arrears of same, these two items accounting for $642,543.51. Royalty and stumpage both show increases, these being respectively $111,323.83 and $70,254.06.

The operating revenue or the amounts charged for products from the actual operation of timber lands was $1,544,251.36, a decrease of only $3,210.11 over the record established in 1920. A comparison of the revenue from forests just prior to the war and at present, and the proportion accruing from rentals as compared with actual operations, is of interest and is given in the cut on following page.


SOURCES OF FOREST REVENUE
RENTAL
MISCELL
STUMPAGE
ROYALTY
1921
RENTAL
MISCELL
STUMPAGE
ROYALTY
1920
RENTAL
MISCELL
STUMPAGE
ROYALTY
1914
RENTAL
MISCELL
STUMPAGE
ROYALTY
1913

Forest Revenue.

	12 Months to Dec., 1921.	12 Months to Dec., 1920.	12 Months to Dec., 1919.	12 Months to Dec., 1918.	12 Months to Dec., 1917.	12 Months to Dec., 1916.
Timber-licence rentals	$1,193,654 58	$1,654,747 43	$1,236,530 41	$1,372,789 28	$1,074,129 07	$1,138,879 22
Trespass penalty	11,245 86	18,114 34	7,464 12	1,599 38	3,207 32	893 39
Royalty and tax	990,326 99	879,003 16	788,746 69	698,059 27	785,543 42	456,863 29
Timber-lease rentals	81,840 61	81,989 68	85,101 37	77,748 25	76,426 74	77,040 59
Scaling fees	2,015 83	25,476 91	64,571 19	56,304 90	62,381 50	32,590 20
Scaling expenses	765 98	5,041 71	13,072 79	9,753 29	6,055 74	3,158 71
Seizure expenses	330 80	530 03	280 12	2,813 82	507 11	1,364 84
Licence penalty	50,859 19	232,309 85	49,259 95	79,605 09	11,928 01	28,524 00
Timber stumpage	317,488 77	247,234 71	219,012 08	151,598 86	113,498 13	68,779 87
Transfer fees	3,735 00	4,855 00	2,790 00	4,625 00	4,070 00	3,670 00
Hand-loggers' licence fees	9,175 00	6,525 00	7,250 00	2,975 00	9,700 00	7,100 00
Interest	21 85	12 59	345 10	69 67	68 04	100 09
Timber-mark fees	.....	.....	.....	.....	.....	.....
Timber-sale rentals	12,659 91	17,881 40	10,045 26	7,753 84	9,457 72	5,235 35
Timber-sales cruising	4,640 39	7,642 80	3,763 49	1,921 73	2,687 03	1,148 74
Timber-sales advertising	1,695 08	2,749 93	1,929 71	1,152 40	1,183 35	391 89
Scalers' examination fees	455 00	670 00	205 00	315 00	295 00	225 00
General miscellaneous	1,972 33	3,363 90	1,055 67	1,980 70	561 53	401 80
Exchange	291 03	2,519 43	3,550 80	1,637 91	470 61	45 22
	$2,683,174 20	$3,190,667 87	$2,494,973 75	$2,472,703 39	$2,162,170 32	$1,826,412 20
Grazing fees	11,221 79	15,617 44	9,500 41	.....	.....	.....
Taxation from Crown-grant timber lands	261,896 49	302,557 26	251,264 82	258,105 14	176,163 20	179,528 56
Total revenue from forest sources	$2,956,292 48	$3,508,842 57	$2,755,738 98	$2,730,808 53	$2,338,333 52	$2,005,940 76

Revenue from Logging Operations, 1921.

(Amounts charged.)

Forest District.	Royalty and Tax.	Trespass Penalties.	Seizure Expenses.	Scaling Expenses.*	Scaling Fees.*	Scaling Fund.		Stumpage.	Totals.
						Scaling Expenses.	Scaling Fees.		
Vancouver	$600,539 92	$3,559 38	$316 45	.....	$ 656 48	$7,550 95	$82,576 27	$183,144 35	$878,343 80
Island	61,465 34	109 40	45 50	$200 16	223 94	2,012 38	15,867 63	.....	79,929 35
Cariboo	2,142 43	137 82	.....	20 00	.....	.....	.....	2,684 69	4,984 94
Cranbrook	105,978 59	625 07	49 00	85 62	.....	.....	.....	17,419 76	124,158 04
Prince Rupert	100,837 78	6,292 45	25 00	65 18	324 03	1,832 78	16,006 53	77,069 58	202,453 33
Nelson	55,369 23	584 78	8 25	21 85	47 25	.....	.....	33,593 74	89,625 10
Vernon	27,540 04	1,207 91	10 00	.....	.....	.....	.....	19,509 36	48,267 31
Fort George	32,496 30	1,051 60	52 15	376 27	.....	.....	.....	36,998 40	70,974 72
Kamloops	18,891 98	728 98	10 50	.....	.....	.....	.....	25,883 31	45,514 77
Totals, 1921	$1,005,261 61	$14,297 39	$516 85	$ 769 08	$ 1,256 70	$11,396 11	$114,450 43	$396,303 19	$1,544,251 36
Totals, 1920	$1,091,389 81	$15,284 61	$121 33	$ 2,677 68	$14,155 57	$10,114 36	$90,889 44	$322,828 67	$1,547,461 47
Totals, 1919	$ 728,711 25	$14,883 57	$250 52	$12,055 43	$61,591 27	†	†	$159,695 09	$ 977,187 13

*On scales made by Rangers, etc. †Scaling Fund was created by 1920 Amendment as from April 1st, 1920.

FOREST EXPENDITURE.

The sums voted for forest-work for the fiscal year 1921–22 were as follows:—

Vote No. 173	—Salaries	$220,686 00
„ 175	—Travelling expenses and wireless telephone	50,250 00
„ 177	—Lumber-trade extension	30,000 00
„ 178	—Reconnaissance, etc.	75,000 00
„ 179	—Insect damage: investigation and control	10,000 00
„ 180	—Grazing: range improvement	6,000 00
		$391,936 00

In addition to this total, sums were available from Vote No. 174 for temporary assistance, and from Vote No. 175 for office supplies, maintenance of launches and autos, and miscellaneous expenses; from Vote No. 188 for publicity; from Vote No. 189, general investigations; and from Vote No. 190, contingencies. The sum of $300,000 was also voted as the amount of the Government's contribution to the Forest Protection Fund.

General Administrative Expenditure.

(For Nine Months, April to December, inclusive.)

Forest District.	Vote 173: Salaries.	Vote 174: Temporary Assistance.	Vote 175: Expenses.	Total.
Headquarters	$ 79,110 32	$ 248 35	$ 26,493 41	$105,852 08
Cariboo	3,558 66	380 00	4,511 52	8,450 18
Cranbrook	6,593 91	.....	7,198 53	13,792 44
Kamloops	4,629 97	18 33	2,202 04	6,850 34
Nelson	6,940 00	8 66	7,014 44	13,963 10
Prince George	8,310 94	750 16	3,178 99	12,240 09
Prince Rupert	14,727 89	1,904 63	23,618 70	40,251 22
Vancouver	58,749 37	1,612 68	76,624 50	136,986 55
Vernon	6,315 74	330 00	6,538 39	13,184 13
Totals	$188,936 80	$5,252 81	$157,380 52	$351,570 13

FOREST PROTECTION FUND.

The following statement shows the standing of the Forest Protection Fund as of December 31st, 1921:—

Deficit brought forward from fiscal year 1919–20		$106,457 03
Expenditure, fiscal year 1920–21	$645,842 29	
Less refunds	11,975 50	
		633,866 79
		$740,323 82
Collections, fiscal year 1920–21	$189,816 80	
Government's contribution	189,816 80	
		379,633 60
Balance (deficit)		$360,690 22
Balance (deficit)	$360,690 22	
Expenditure, April–Dec., 1921 (nine mths.)	$427,443 00	
Less refunds (nine months)	12,094 00	
	$415,349 00	
		776,039 22
Collections, April to December, 1921 (nine months)	$142,756 31	
Government's contribution (nine months)	237,181 74	
		379,938 05
Deficit on nine months' working		$396,101 17

Forest Protection Expenditure.

	Fiscal Years.							
	1914–15.	1915–16.	1916–17.	1917–18.	1918–19.	1919–20.	1920–21.	1921–22 (9 mos., April 1st to Dec. 31st, 1921).
Patrols	$228,352	$157,432	$144,251	$100,304	$159,030	$198,172 35	$267,402 76	$297,766
Improvements	31,385	5,151	3,747	20,111	36,913	28,397 43	85,548 87	25,561
Fires	143,461	19,449	7,124	91,470	50,293	165,688 80	292,890 66	104,116
Totals	$403,198	$182,032	$155,122	$211,885	$246,236	$392,258 58	$645,842 29	$427,443

Expenditure by Districts for Nine Months ending December 31st, 1921.

Forest District.	Patrol.	Fires.	Improvements.	Total.
Cariboo	$ 13,928	$ 3,980	$ 2,064	$ 19,972
Cranbrook	31,634	22,356	1,247	55,237
Kamloops	27,930	2,713	1,214	31,857
Nelson	31,512	43,859	2,486	77,857
Prince George	23,169	2,507	4,497	30,173
Prince Rupert	16,413	692	532	17,637
Vancouver	85,642	14,124	12,234	112,000
Vernon	19,668	13,885	1,287	34,840
Victoria	7,870	.....	.....	7,870
Undistributed	40,000	.....	.....	40,000
Totals	$297,766	$104,116	$25,561	$427,443

CROWN-GRANT TIMBER LANDS.

	Area of Private Timber Lands.	Average Value per Acre.
1911	824,814	$ 8 72
1912	874,715	8 60
1913	922,948	9 02
1914	960,464	9 66
1915	913,245	9 55
1916	922,206	9 73
1917	916,726	9 61
1918	896,188	9 60
1919	883,491	9 48
1920	867,921	11 62
1921	845,111	10 33

The extent and value of timber land in the various assessment districts are shown by the following table:—

Assessment District.	Acreage, 1921.	Increase or Decrease in Acreage over 1920.	Average Value per Acre.	Change in Value per Acre since 1920.
Alberni	45,251	+684.26	$20 72	-0.33
Comox	186,360	-6,179.20	13 16	+0.16
Cowichan	94,949	+3,869.43	16 76	+1.99
Fort Steele	29,732	-40,169.82	11 03	+3.42
Golden	81,298	+1,491.41	3 80	No change.
Kettle River	4,515	+39.95	2 97	-0.03
Nanaimo	88,145	-396.97	12 51	+0.43
Nelson	184,852	+14,121.63	3 38	+0.22
Prince Rupert	1,168	+1,168.00	16 51	.....
Revelstoke	48,609	No change.	11 52	-0.04
Rossland	16,673	No change.	3 52	+0.02
Slocan	44,450	+28.44	6 97	+1.91
Vancouver	2,660	No change.	25 00	No change.
Victoria	16,449	+2,533.00	21 61	-5.89
Totals	845,111	-22,809.87	10 33	-1 29

REPORT ON TIMBER-MARKS FOR THE YEAR 1921.

	1920.	1921.
Old Crown grants	108	106
Crown grants, 1887–1906	119	73
Crown grants, 1906–1914	115	83
"Royalty Act"	330	240
Stumpage reservations	23	26
Pre-emptions under sections 28A and 28B, "Land Act"	22	53
Timber leases (50 cents royalty)	12	3
Dominion lands	49	36
Timber-sales	581	524
Hand-loggers	128	140
Carried forward	1,487	1,284

REPORT ON TIMBER-MARKS—*Continued.*

Brought forward	1,487	1,284
Special marks	2	1
Rights-of-way	2	2
Totals	1,491	1,287
Transfers and changes of marks	295	350
Hand-loggers' licences issued (approximate)	325	370

CORRESPONDENCE.

Letters inward, numbered and recorded	26,000
Letters, reports, etc., received, not numbered or recorded	12,000
Total	38,000
Outward typed letters	19,160
Outward circulars, form letters, etc.	22,500
Total	41,660

WORK DONE BY FOREST BRANCH DRAUGHTING OFFICE.

During the year the Draughting Office has prepared thirty new blue-prints of reference maps for the atlas and thirty-seven old atlas maps were brought up to date. In every case all atlas references have been carefully altered to comply with the new map.

A new gazetteer for the atlas has been started for use in the Draughting Office and is well on to completion.

In addition to the above work the staff has been engaged on the preparation of plans showing surveyed timber licences throughout the Province, with bearing trees. Ninety-six of these plans have been made, all in the Vancouver Forest District.

In regard to the routine work, which consists of making tracings, principally for blue-printing, of sketches for examination, timber-sales, etc., the following analysis will show it in detail:—

Month.	NUMBER OF TRACINGS MADE.						Blue-prints made from S.G. Ref. Maps.
	Examination Sketches.	Timber-sales.	Hand-loggers.	Timber-marks.	Miscellaneous.	Totals.	
January	62	25	17	139	17	260	37
February	64	15	37	96	24	236	15
March	43	29	47	43	41	203	31
April	90	18	86	68	16	278	13
May	80	19	42	95	33	269	8
June	72	11	46	74	42	245	167
July	75	9	17	56	31	188	15
August	72	10	26	45	25	178	63
September	51	7	14	55	23	150	7
October	43	22	23	38	29	155	42
November	50	5	8	66	37	166	13
December	39	14	8	65	26	152	115
Totals	741	184	371	840	344	2,480	526

From time to time numerous graphs have been prepared, requiring considerable study and thought, and much work has been done in supplying the cruising parties with adequate information on which to base their sketches; also in making the finished maps from the sketches sent in.

FOREST PROTECTION.

The fire season of 1921 was normal in the coastal and northern regions, but rose above normal in the Southern Interior. A larger number of fires broke out and were fought in 1921 than in 1920, but owing to a more complete system of organization the fire losses were cut very appreciably; the results are shown in the tables following.

PUBLICITY.

The publicity programme followed out during the season consisted of carrying advertising matter in the various papers throughout the Province during the danger months of June, July, and August, appealing to the general public to be careful with fire. Calendars were issued bearing publicity matter relative to slash-burning and the precautions that should govern this operation. Twenty-two thousand posters bearing excerpts from the Fire Law and Logging Regulations were issued and displayed. In addition to this, 30,000 envelopes bearing a pictorial warning to fishermen were distributed through the various sporting-goods houses, who used them as wrappers for fishing-tackle.

FIRE LAW ENFORCEMENT.

When laws governing the use of fire are enacted it becomes the duty of the interested organizations to enforce their compliance. Consequently, infractions of the Fire Law were vigorously dealt with, and seventy-nine informations were laid for contravening the Regulations. Forty-five prosecutions were entered for burning without a permit, fourteen for leaving camp-fires burning, five for refusing to fight fire, six for neglecting fire when burning on the defendants' property, and the remaining nine for failure to equip donkeys with the necessary fire-preventive equipment, operating an open burner without a permit, and two incendiary cases.

The vigorous enforcement of the Fire Law is necessary if we are to stop the annual occurrence of fires resulting from carelessness. In this policy we feel that the Department is backed by the force of public opinion.

ORGANIZATION.

The maximum strength of the staff during the fire season was 461, of which number 255 were temporary. In addition to this, 196 Honorary Fire Wardens were enrolled. These latter public-spirited citizens undertook to immediately suppress any fires which occurred in their immediate vicinity. It is this prompt initial action which is so desirable in fire-suppression, and the Honorary Fire Wardens proved themselves to be of great assistance and carried out in the fullest sense their responsibilities as citizens. The thanks of the Department and the public generally are due to these men.

FIRE OCCURRENCE.

As already stated, the season was normal on the Coast and Northern Interior, but south of the Railway Belt a four to six weeks' drought, assisted by high temperatures and strong winds, brought more than the usual quota of fires. This is clearly denoted in the weather chart which follows this résumé.

The total number of fires fought during 1921 was 1,330, against 1,251 for 1920, an increase of 6 per cent. It will, however, be noted that 554, or 41.6 per cent. of the total, were extinguished before they had reached a quarter of an acre in size, and 436, or 32.8 per cent., before they had spread over 10 acres. The remainder, 340, covered areas of more than 10 acres. It is a very creditable record to have suppressed practically 75 per cent. of the fires during the past season before they had spread over 10 acres, as compared with 68 per cent. in 1920, 67 per cent. in 1919, and only 66 per cent. in 1918.

Further classification shows that 1,169, or 88 per cent., were extinguished before they had done damage to the extent of $100; 134, or 10 per cent., did damage between $100 and $1,000; and 27, or only 2 per cent., did more than $1,000 worth of damage. When we consider that each of these fires might have assumed large proportions had it not been for the Forest Protection staff, the real value of this organization becomes apparent.

The season's record, therefore, is one that reflects credit on the increased efficiency shown by the fieldmen and organizing staffs.

CAUSES OF FIRES.

In spite of the publicity work carried on, fires caused by campers and travellers still head the list, causing 308 fires, or 23.2 per cent., while the operation of railways caused 283, or 21.3 per cent. Lightning and industrial operations were the cause of 164 and 119 respectively, the percentage of the total being 12.3 and 9 per cent. respectively. Other causes, in the order of fire-occurrence numbers, were brush-burning, miscellaneous, known and unknown causes, and incendiary. It is to be regretted that such a large percentage of the fires are from human

causes, carelessly left camp-fires, lighted cigarette-stubs, or defective spark-screens. It at the same time points to need of further educational work on this subject.

DAMAGE BY FIRE.

The quantity of timber killed by fire in 1921 was 68,000,000 feet, of which 39,500,000 is salvable, leaving a net stumpage loss of $73,011, as compared with a loss in 1920 of 180,000.000 feet valued at $294,873, a decrease of 75 per cent. Other forms of property destroyed amounted to $195,221, of which the loss due to burning of buildings, logging camps, and equipment is $153,660, the remaining loss of $41,561 representing the loss of products in the course of manufacture, grain, fruit-trees, etc. From a point of view of damage, the season compares very closely with the year 1917, a year of very low fire risk, when the damage done amounted to $291,457, but the number of fires in that year was but 986, compared with 1,330 in 1921.

SLASH-BURNING.

During the past year, following the policy of encouraging land-clearing before and after the peak of the danger period, 74,696 acres were burned over, compared with 53,425 acres in 1920. The permits issued amounted to 12,730, compared with 6,782 of 1920, or an increase of 88 per cent. Of these permit fires, but 59, or less than one-half of 1 per cent., escaped control; 15,683 acres of logging-slash burned during the season under permit, while an area of 29,237 acres was disposed of under co-operative arrangement provided in section 127A of the "Forest Act," making the total area of logging-slash disposed of during the year 44,920 acres. The elimination of this hazard will materially reduce the hazard for 1922, and it is hoped that fire-fighting costs and expense will be cut down in proportion.

AVIATION.

The establishment by the Dominion Air Board of a seaplane base at Jericho Beach for co-operation with the various Government departments gave the Branch an opportunity during the present season of trying out aeroplanes in forest-protection work. In the area around the Gulf of Georgia there is a heavy concentration of logging camps and a great number of donkeys operating. Tourists, campers, and automobile parties flock to the mountain and seaside resorts during the holidays and week-ends, increasing materially the hazard at that time.

Throughout the months of July and August a system of bi-weekly patrols was instituted. This patrol was carried out on Wednesdays and Sundays and consisted of a circuitous trip from Point Grey, following the Coast north to Bute Inlet, landing and reporting from Thurston Bay Ranger Station, and returning by the east coast of Vancouver Island. The trip occupied about three hours of flying-time and meant that approximately 3,500,000 acres of territory was covered, and the forest officer in charge had a knowledge of all forest fires burning within that region.

In addition to the above fire-detection, patrols and planes were used in making a reconnaissance of the damage done by the storm of January 29th, 1921, and of general timber reconnaissance. In all, fifty-six flights were made, and the results were most satisfactory and show conclusively that the plane has possibilities as a complement to our ground force in forest-protection, as well as being of considerable service in gathering general information rapidly and in supervision where time has to be considered.

PUMP OPERATION.

Various improvements were evolved in the portable fire-fighting pump adopted by the Department and as a result this piece of mechanical equipment was used to a greater extent than heretofore, both for fire-fighting purposes and for control of slash-burning fires.

The total running-time of the pumps as shown by reports is 2,400 hours. If the figure of 35 gallons per minute of delivered water is taken, and this figure is acknowledged as a conservative one, it means that a total of 5,760,000 gallons of water was used in the control and extinguishing of forest fires, or 25,200 tons of water. There can be no doubt whatever that the use of this mechanical means of fire-suppression marks the greatest step forward in recent years in the work of forest-protection.

To a greater extent than ever, logging-camp operators are adopting this means of fire-suppression, showing conclusively that it has passed the primary experimental stage and is now accepted as a necessary piece of equipment in a modern logging operation.

WIRELESS TELEPHONE.

The continued and increased use of the wireless telephone during the season again proved that rapid communication in the areas that are devoid of the ordinary telephone and telegraphic facilities, or, in some cases, a fairly frequent mail service, is an essential in order to carry out the work of forest-protection.

The three land stations, situated at Vancouver, Myrtle Point, and Thurston Bay, were fully occupied during the past season, a total of over 2,000 messages being received and relayed during the fire season, May to September. An improvement in the sending capacities of the launch transmitting-sets was effected, which added materially to the increased use and efficiency of this means of communication. When it is known that over 90 per cent. of the messages transmitted during the fire season had direct reference to forest-protection matters, the importance of the wireless telephone system can be appreciated at its full value.

The field office staffs were kept in close touch with each other as the season progressed, and transfers of men and equipment were immediately ordered and carried out at a speed that would have been otherwise impossible owing to the slowness of the only other means of communication.

IMPROVEMENTS.

Equipment for fire-fighting was still further augmented and brought to what is considered to be our general requirements, and all districts received additional supplies of fire-tools, fire-pumps, hose, and general equipment. These were placed at strategic points and in case of fire breaking out were readily available to meet the emergency. Noteworthy among the equipment secured was twenty-six fire-fighting pumps and fifteen new cars.

The forest-protection equipment now in possession of the Branch consists of 41 launches, 53 cars, 75 pumps, 88,800 feet of hose, with shovels, axes, mattocks, and general equipment for 2,642 men, with a capital value of $147,500.

In addition to trails and telephones, the Branch now has the following permanent forest improvements: 16 tool-caches; 10 Ranger and Assistant Ranger headquarters; 27 rest-cabins and look-outs; 2 garages.

Approximately 1,200 miles of trail were cleared and constructed during the past fire season, about 90 per cent. of the work being done by departmental labour as opportunity offered.

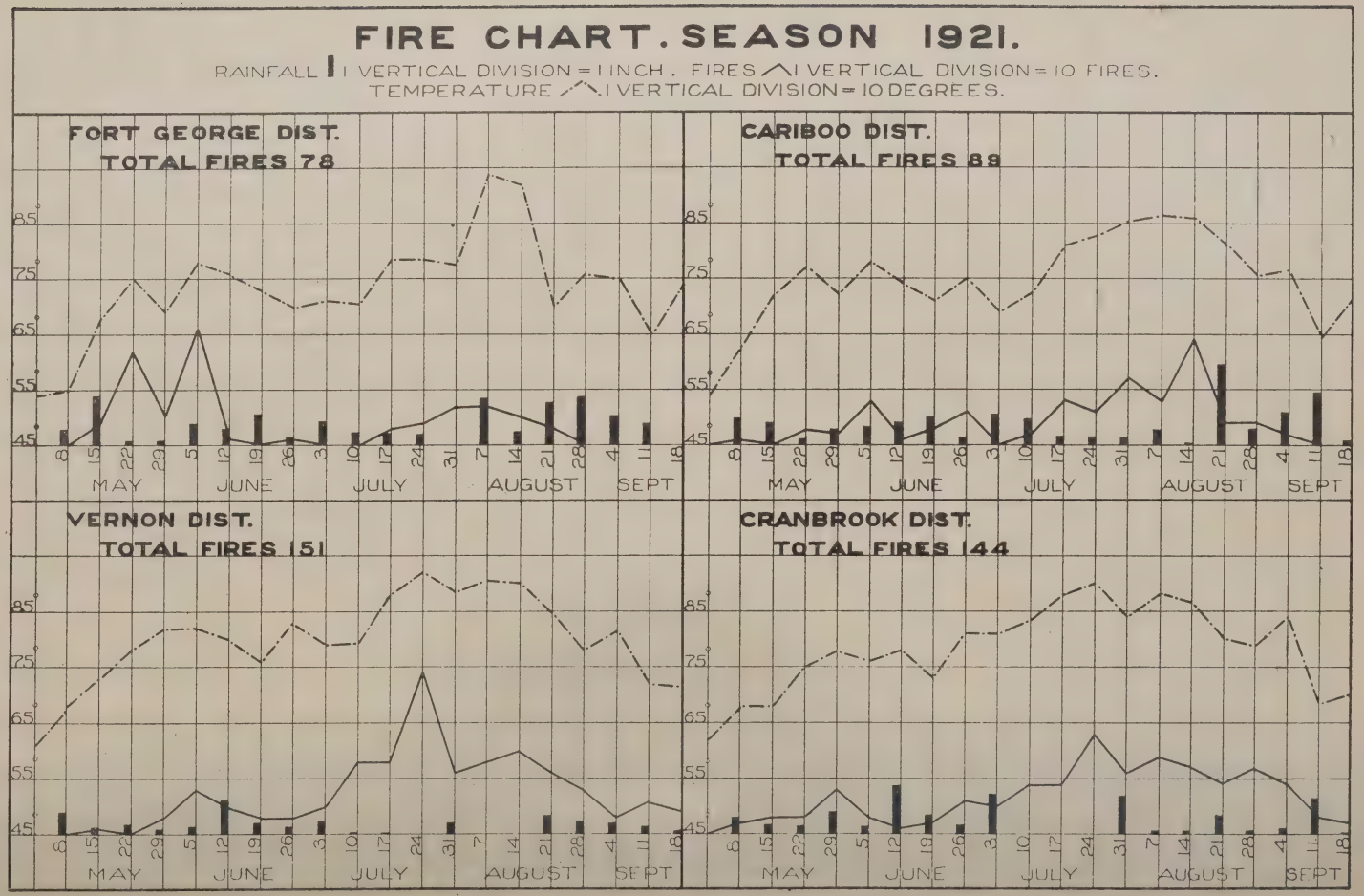
The programme of opening up the back valleys will be carried out more and more each year as the surveys of existing trails are made, so that new trails may be projected in a manner that will create a co-ordinated system.

FOREST BRANCH ORGANIZATION.

DISTRIBUTION OF TOTAL FORCE, BRITISH COLUMBIA FOREST BRANCH.

Forest District.	PERMANENT.															TEMPORARY.						Totals.
	Chief Forester and Foresters.	Grazing Commissioner and Assistant.	Lumber Commissioners and Assistant.	District Foresters.	Supervisor of Scalers and Assistants.	Scalers.	Asst. Foresters, Asst. Dist. Foresters, and Junior Foresters.	Railway Inspector.	Royalty Inspector and Assistant.	Mechanical Inspector.	Supervisors of Rangers.	Rangers.	Draughtsmen.	Export Patrolman.	Clerks, Stenographers, and Messengers.	Telephone-men and Others.	Assistant Rangers.	Patrolmen.	Launch Crews and Repairmen.	Lookout-men, Canoe-men, and Packers.	Cruisers and Compass-men.	
Cariboo	....	....	....	1	....	....	....	....	....	....	....	3	....	....	1	....	4	9	....	....	....	18
Cranbrook	....	....	....	1	....	....	1	....	....	....	....	5	1	....	1	....	6	22	....	3	....	40
Kamloops	....	....	....	1	....	....	1	....	....	....	....	3	....	....	2	....	9	20	....	....	....	36
Nelson	....	....	....	1	....	....	....	....	....	....	1	5	....	....	3	....	11	24	....	....	....	45
Prince George	1	....	....	....	....	....	....	....	....	....	2	5	1	....	2	....	11	8	....	....	....	30
Prince Rupert	1	....	....	....	....	2	2	....	....	....	1	5	....	....	6	1	5	5	6	2	....	36
Vancouver	1	....	....	....	....	21	3	....	....	....	4	20	1	1	23	4	27	32	16	....	....	153
Vernon	....	....	....	1	....	....	1	....	....	....	....	4	....	....	2	....	6	6	....	2	....	22
Victoria	3	2	3	....	3	....	7	1	2	1	....	....	7	....	36	....	....	....	....	....	16	81
Totals	6	2	3	5	3	23	15	1	2	1	8	50	10	1	76	5	79	126	22	7	16	461

FIRE CHART. SEASON 1921.
RAINFALL ▮ 1 VERTICAL DIVISION = 1 INCH . FIRES ⌒ 1 VERTICAL DIVISION = 10 FIRES.
TEMPERATURE ⌒ 1 VERTICAL DIVISION = 10 DEGREES.
PRINCE RUPERT DIST.
TOTAL FIRES 52
KAMLOOPS DIST.
TOTAL FIRES 119
VANCOUVER DIST.
TOTAL FIRES 359
NELSON DIST.
TOTAL FIRES 340
95°
85°
75°
65°
55°
45°
MAY
JUNE
JULY
AUGUST
SEPT


FIRE CHART. SEASON 1921.
RAINFALL | 1 VERTICAL DIVISION = 1 INCH. FIRES /\ 1 VERTICAL DIVISION = 10 FIRES.
TEMPERATURE /\ 1 VERTICAL DIVISION = 10 DEGREES.
FORT GEORGE DIST.
TOTAL FIRES 78
CARIBOO DIST.
TOTAL FIRES 88
VERNON DIST.
TOTAL FIRES 151
CRANBROOK DIST.
TOTAL FIRES 144
85°
75°
65°
55°
45°
8 15 22 29 5 12 19 26 3 10 17 24 31 7 14 21 28 4 11 18
MAY JUNE JULY AUGUST SEPT

FIRE CHART. SEASON 1921.
RAINFALL ▌ 1 VERTICAL DIVISION = 1 INCH.
FIRES /\ 1 VERTICAL DIVISION = 30 FIRES.
TEMPERATURE /·\ 1 VERTICAL DIVISION = 10 DEGREES.
TOTAL FIRES IN PROVINCE
1332
Temperature for Province
Mean Max
85°
75°
65°
55°
45°
MAY
JUNE
JULY
AUGUST
SEPT
8
15
22
29
5
12
19
26
3
10
17
24
31
7
14
21
28
4
11
18

DAMAGE CAUSED BY FOREST FIRES.

Forest District.	MERCHANTABLE TIMBER DESTROYED OR DAMAGED.				VALUABLE REPRODUCTION.		CUT-OVER LAND, UNMERCHANTABLE TIMBER, OLD BURN, NOT RESTOCKING.			GRAZING RANGE.		GRAND TOTALS.					
	Area.	Quantity killed.	Quantity salvable.	Net Stumpage Loss.	Area.	Estimated Present Damage.	Area.	Quantity killed.	Damage to Standing Timber.	Area.	Damage.	Area.		Quantity.		Damage.	
	Acres.	M. Ft. B.M.	M. Ft. B.M.		Acres.		Acres.	M. Ft. B.M.		Acres.		Acres.	Per Cent.	M. Feet B.M.	Per Cent.		Per Cent.
Cariboo	12	939	.....	$ 1,908	27	$ 2,278	6,902	....	....	26,532	$4,119	33,473	23.0	939	1.4	$ 8,305	8.5
Cranbrook	9,319	54,850	38,050	47,580	3,503	178	12,364	....	...	3,660	31	28,846	19.7	54,850	80.1	47,789	49.2
Kamloops	10,412	234	.....	400	495	2,294	3,588	....	....	120	18	14,615	10.0	234	0.3	2,712	2.8
Nelson	3,189	3,237	1,056	3,890	1,830	7,886	27,139	....	....	2,621	393	34,779	23.9	3,237	4.7	12,169	12.4
Prince George	555	2,029	125	4,540	360	923	6,217	400	$630	40	6	7,172	4.9	2,429	3.6	6,099	6.3
Prince Rupert	274	1,266	17	2,497	288	454	8,261	....	100	167	31	8,990	6.2	1,266	1.9	3,082	3.2
Vancouver	862	4,205	250	10,755	842	1,119	2,550	....	...	23	4	4,277	2.9	4,205	6.1	11,878	12.2
Vernon	5,370	1,316	55	1,441	1,567	3,130	1,900	....	....	4,849	727	13,686	9.4	1,316	1.9	5,298	5.4
Totals	29,993	68,076	39,553	$ 73,011	8,912	$ 18,262	68,921	400	730	38,012	5,329	145,838	100	68,476	100	$ 97,332	100
Per cent	20.6	99.9	57.7	75.0	6.1	18.8	47.3	0.1	0.7	26.0	5.5	100	...	100	....	100	....
Totals, 1920	50,290	225,140	49,575	$294,873	55,662	$184,859	244,187	4,113	5,042	39,707	1,189	389,846	....	229,253	....	$485,963	....
Per cent	12.9	98.2	21.2	60.6	14.3	38.0	62.6	1.8	1.1	10.2	0 3	100	....	100	....	100	....
Totals, 1919	59,746	285,955	93,559	$262,350	40,978	$122,787	293,214	1,565	6,290	39,858	1,755	433,797	....	381,079	....	$393,183	....
Per cent	13.8	75.0	24.6	66.7	9.4	31.2	67.6	0.4	1.6	9.2	0.5	100	....	100	....	100	....

DAMAGE TO PROPERTY OTHER THAN FORESTS, 1921.

Forest District.	Products in Process of Manufacture.	Buildings.	Railway and Logging Equipment.	Miscellaneous.	Totals.	Per Cent. of Total.
Cariboo	$ 120	$ 200	.....	$ 200	$ 520	0.3
Cranbrook	23,210	16,000	$50,000	.....	89,210	45.6
Kamloops	666	1,200	.....	.....	1,866	1.0
Nelson	4,911	1,750	140	3,540	10,341	5.3
Prince George	225	200	.....	.....	425	0.2
Prince Rupert	2,154	16,355	.....	400	18,909	9.7
Vancouver	5,827	30,150	24,265	268	60,510	31.0
Vernon	.....	13,400	.....	40	13,440	6.9
Totals	$37,113	$79,255	$74,405	$4,448	$195,221	100.0

COMPARISON OF DAMAGE CAUSED BY FOREST FIRES IN THE LAST SEVEN YEARS.

	1921.	1920.	1919.	1918.	1917.	1916.	1915.
Total number of fires	1,330	1,251	1,141	910	986	864	1,031
Area burned (acres)	145,838	389,846	433,797	140,085	237,289	161,288	244,189
Standing timber destroyed or damaged (M. ft. B.M.)	68,476	229,253	287,520	42,886	267,186	50,415	187,250
Amount salvable (M. ft. B.M.)	39,553	49,575	93,559	22,387	48,133	2,757	43,030
Damage to forests	$ 97,332	$485,963	$393,183	$ 25,930	$129,125	$48,913	$108,873
Damage to other forms of property	195,221	473,900	345,787	200,335	162,333	26,962	57,774
Total damage	$292,553	$959,863	$738,970	$226,265	$291,457	$75,875	$166,647

FIRES, 1921, CLASSIFIED BY PLACE OF ORIGIN AND COST OF FIRE-FIGHTING.

Forest District.	Total Fires.	Originated on Vacant Crown Lands and Lands paying F.P. Tax.	Originated on Lands not paying F.P. Tax.	Extinguished without Cost.			Cost Money to extinguish.			Total Cost of fighting Fire.		Average Cost per Fire.
				No.	Per Cent. of Total Fires in District.	Per Cent. of Total Fires in Province.	No.	Per Cent. of Total Fires in District.	Per Cent. of Total Fires in Province.	Dollars.	Per Cent. of Total spent in fighting Fires in Province.	Dollars.
Cariboo	89	57	32	62	7.0	4.7	27	6.1	2.2	3,860	3.9	43 37
Cranbrook	144	141	3	80	9.0	6 0	64	14.5	4.8	20,089	20.2	139 51
Kamloops	119	22	97	100	11.2	7.5	19	4.3	1.4	2,689	2.7	22 60
Nelson	339	72	267	217	24.4	16.3	122	27.8	9.3	42,663	43.3	125 85
Prince George	78	10	68	70	7.7	5 3	8	1.9	0.6	2,507	2.6	32 14
Prince Rupert	52	10	42	42	4.7	3.2	10	2.3	0.8	692	0.7	13 31
Vancouver	359	64	295	220	24.8	16.5	139	31.7	10.1	12,995	13.3	36 20
Vernon	150	39	111	100	11.2	7.5	50	11.4	3.8	12,981	13.3	86 54
Totals	1,330	415	915	891	100.0	67.0	439	100.0	33.0	98,476	100.0	74 04
Per cent	100.0	31.2	68.8	67.0	....	...	33.0	...	...	.....	.....	.....
Totals, 1920	1,251	384	867	611	....	48.8	646	....	51.2	257,126	.....	205 53
Per cent	100.0	30.7	69.3	48.8	....	....	51.2	....	....	.....	.....	.....
Totals, 1919	1,141	422	719	518	....	45.4	623	....	54 6	158,707	.....	139 09
Per cent	100.0	37.0	63.0	45.4	....	....	54.6	....	....	.....	.....	.....

FIRES, 1921, CLASSIFIED BY SIZE AND DAMAGE.

Forest District.	TOTAL FIRES.		UNDER ¼ ACRE.			¼ ACRE TO 10 ACRES.			OVER 10 ACRES IN EXTENT.			DAMAGE.		
	No.	Per Cent. of Total Fires in Province.	No.	Per Cent. of Total Fires in District.	Per Cent. of Total Fires in this Class.	No.	Per Cent. of Total Fires in District.	Per Cent. of Total Fires in this Class.	No.	Per Cent. of Total Fires in District.	Per Cent. of Total Fires in this Class.	Under $100.	Between $100 and $1,000.	Over $1,000.
Cariboo	89	6.7	16	18.0	2.9	24	27.0	5.5	49	55.0	14.4	79	9	1
Cranbrook	144	10.8	22	15.3	4.0	63	43.7	14.5	59	41.0	17.4	111	29	4
Kamloops	119	9.0	46	38.6	8.3	60	50.4	13.7	13	11.0	3.8	114	5	....
Nelson	339	25.5	180	53.1	32.5	101	29.7	23.2	58	17.2	17.1	290	39	10
Prince George	78	5.8	9	11.5	1.6	26	33.3	6.0	43	55.2	12.6	70	7	1
Prince Rupert	52	3.9	4	7.7	0.7	17	32.7	3.9	31	59.6	9.1	43	7	2
Vancouver	359	27.0	243	67.7	43.9	78	21.7	17.9	38	10.6	11.2	335	17	7
Vernon	150	11.3	34	22.6	6.1	67	44.4	15.3	49	33.0	14.4	127	21	2
Totals	1,330	100.0	554	....	100.0	436	....	100.0	340	....	100.0	1,169	134	27
Percent	100.0	....	41.6	....	....	32.8	....	....	25.6	....	....	88.0	10.0	2.0
Totals, 1920	1,251	....	345	....	....	392	....	....	514	....	....	1,049	107	95
Per cent	100.0	....	27.6	....	....	31.3	....	....	41.1	....	....	83.8	8.6	7.6
Totals, 1919	1,141	....	290	....	....	374	....	....	477	....	....	993	95	53
Per cent	100.0	....	25.4	....	....	32.8	....	....	41.8	....	....	87.1	8.3	4.6

NUMBER AND CAUSES OF FIRES, 1921.

Forest District.	Lightning.	Campers and Travellers.	Railway Operation.	Railways under Construction.	Brush-burning, not Railway-clearing.	Public Road-construction.	Industrial Operation.	Incendiary.	Miscellaneous (Known Causes).	Unknown Causes.	Total.	Per Cent. of Total Fires in Province.
Cariboo	3	44	1	..	7	..	3	4	2	25	89	6.7
Cranbrook	25	35	17	..	7	2	11	9	11	27	144	10.8
Kamloops	14	2	69	..	8	6	..	1	1	18	119	8.9
Nelson	88	62	108	..	30	2	6	3	6	34	339	25.5
Prince George	..	12	18	..	11	3	1	2	12	19	78	5.9
Prince Rupert	..	8	10	..	17	1	2	..	1	13	52	3.9
Vancouver	6	102	26	1	45	5	88	16	23	47	359	27.0
Vernon	28	43	34	1	1	1	8	5	8	21	150	11.3
Totals	164	308	283	2	126	20	119	40	64	204	1,330	100.0
Per cent.	12.3	23.2	21.3	0.1	9.5	1.5	9.0	3.0	4.8	15.3	100.0	....

NUMBER AND CAUSES OF FOREST FIRES FOR THE LAST NINE YEARS.

Causes.	1921.	1920.	1919.	1918.	1917.	1916.	1915.	1914.	1913.
Lightning	164	304	115	134	48	67	100	169	34
Campers and travellers	308	246	310	158	209	268	305	487	195
Railway operation	283	227	146	104	335	121	82	361	110
Railways under construction	2	1	22	1	.....	.....	17	98	62
Brush-burning, not railway-clearing	126	96	97	100	48	148	267	164	26
Public road-construction	20	7	5	2	5	12	20	11	9
Industrial operation	119	104	129	80	50	59	28	50	24
Incendiary	40	32	21	15	13	22	28	42	7
Miscellaneous (known causes)	64	69	140	72	55	19	24	83	7
Unknown causes	204	165	156	224	214	148	160	367	104
Totals	1,330	1,251	1,141	910	986	864	1,031	1,832	578

BURNING PERMITS, 1921.

Forest District.	CLEARING AGRICULTURAL LAND.				CLEARING LOGGING-SLASH.				CLEARING RAILWAY RIGHT-OF-WAY.				CLEARING PUBLIC ROADS.				GRAND TOTALS.			
	Permits issued.	Area burned over.	Fires escaped Control.	Fires set without Permit.	Permits issued.	Area burned over.	Fires escaped Control.	Fires set without Permit.	Permits issued.	Area burned over.	Fires escaped Control.	Fires set without Permit.	Permits issued,	Area burned over.	Fires escaped Control.	Fires set without Permit.	Permits issued.	Area burned over.	Fires escaped Control.	Fires set without Permit.
	No.	Acres.	No.	No.	No.	Acres.	No.	No.	No.	Acres.	No.	No.	No.	Acres.	No.	No.	No.	Acres.	No.	No.
Cariboo	537	4,085	.....	3	28	3,318	1	.....	5	391	.....	.....	7	41	.....	.....	577	7,835	1	3
Cranbrook	448	2,072	1	1	28	850	.....	.....	18	5,720	.....	.....	8	71	2	.....	502	8,713	3	1
Kamloops	515	2,357	6	8	36	138	.....	32	11	77	.....	.....	2	32	.....	.....	564	2,604	6	40
Nelson	1,515	2,277	4	13	54	623	.....	.....	10	319	.....	.....	22	799	2	.....	1,601	4,018	6	13
Prince George	1,287	11,321	6	2	14	288	.....	.....	26	1,188	11	.....	16	454	2	.....	1,343	13,251	19	2
Prince Rupert	1,102	10,037	8	9	.....	.....	.....	.....	25	.....	6	4	8	.....	.....	1	1,135	10,037	14	14
Vancouver	6,191	12,946	3	25	133	8,422	1	.....	15	335	.....	.....	39	247	.....	.....	6,378	21,950	4	25
Vernon	586	3,675	3	1	31	2,044	.....	.....	8	500	2	1	5	69	1	1	630	6,288	6	3
Totals	12,181	48,770	31	62	324	15,683	2	32	118	8,530	19	5	107	1,713	7	2	12,730	74,696	59	101
Per cent	95.7	65.4	52.6	61.4	2.5	20.9	3.4	31.7	0.9	11.4	32.2	4.9	0.8	2.3	11.8	2.0	100.0	100.0	100.0	100.0
Totals, 1920	6,030	29,926	37	33	626	21,407	10	5	59	1,372	2	.....	67	720	3	.....	6,782	53,425	52	38
Per cent	88.9	56.0	71.1	86.8	9.2	40.0	19.2	13.2	0.9	2.6	3.9	.....	1.0	1.4	5.8	....	100.0	100.0	100.0	100.0

PROSECUTIONS FOR FIRE TRESPASS, 1921.

Forest District.	Information laid.	Failure to equip Donkey or Camp with Fire-fighting Tools.	Contravention of Section 111 of "Forest Act."	Contravention of Section 121 of "Forest Act."	Operating Open Burner without Permit.	Contravention of Section 127 of "Forest Act."	Burning without Permit.	Incendiary.	Leaving Camp-fires burning.	Refusing to fight Fires.	Fines. No.	Fines. Amount.	Suspended Sentence.	Cases dismissed.	Cases pending.	Cases withdrawn.
Cariboo	7	..	..	..	..	..	3	..	..	4	2	$ 20 00	1	..	4	..
Cranbrook	10	..	..	..	..	..	1	..	8	1	8	251 50	..	..	2	..
Kamloops	8	..	..	..	..	..	8	..	..	..	6	60 00	1	1	..	..
Nelson	14	..	..	..	..	1	10	1	2	..	10	116 00	1	3	..	..
Prince George	2	..	..	..	..	..	2	..	..	..	2	20 00	..	..	..	..
Prince Rupert	1	..	..	..	..	..	1	..	..	..	..	.....	1	..	..	..
Vancouver	36	2	1	2	2	5	19	1	4	..	25	552 00	3	5	1	2
Vernon	1	..	..	..	..	..	1	..	..	..	1	10 00	..	..	..	..
Totals	79	2	1	2	2	6	45	2	14	5	54	$1,029 50	7	9	7	2
Totals, 1920	34	..	..	..	..	6	22	1	2	3	21	$ 442 50	2	9	2	..

IMPROVEMENTS AND MAINTENANCE, 1921.

The following amounts were spent on improvements and maintenance, by districts:—

Cariboo.

Improvements—	
Garage and oil-house, Quesnel	$ 250 00
Roofing Williams Lake Headquarters	150 00
Two fire-fighting pumps, equipped	1,879 14
One Ford car	425 00
	$ 2,704 14

Cranbrook.

Improvements—	
Fernie Garage	$ 428 00
Gold Creek Trail and Telephone Line	194 00
Sheep Creek Trail	30 00
Sulphur Creek Trail	212 00
McGuire–Wigwam Trail	250 00
Three Ford cars	1,312 00
Two fire-fighting pumps, equipped	1,516 50
	$ 3,942 50
Maintenance—	
Casey Mountain Telephone Line	$ 118 00
Baker Mountain Telephone Line	56 00
Elk Valley Telephone Line	148 00
	$ 322 00

Kamloops.

Improvements—	
Birch Island Telephone Line	$ 26 00
Blue River Speeder-house	17 00
Swift Creek Speeder-house	47 00
Birch Island Speeder-house	70 00
Barriere Forks–Brennan Creek Trail	375 00
Blue River Ranger Station Fuel-shed	32 00
One railway velocipede	125 00
Two fire-fighting pumps, equipped	1,530 00
	$ 2,222 00

Kamloops—Continued.

Maintenance—	
Painting and repairs, Seymour Arm Ferry, Scow, and Shed	$ 30 00
Humamilt Cabin	61 00
Thompson Crossing Ranger Station	9 00
Big Bend Telephone	17 00
	$ 117 00

Nelson.

Improvements—	
Launch "Amabilis"	$ 1,500 00
Launch "Willow"	500 00
One power-speeder	430 00
Boat-house	338 00
One Ford car	444 00
Ymir Garage	13 00
Lardeau Speeder-house and Tool-shed	128 00
Whatshan Rowboat and Shelter	129 00
Grizzley Creek Cabin	3 00
Falls Creek Cabin	108 00
Marsh Creek and Champion Lake Trail	40 00
Four fire-fighting pumps, equipped	3,060 00
Slash-burning	314 00
	$ 6,693 00
Maintenance—	
Ymir Tool-shed	$ 8 00
Hooker Creek Trail	45 00
Kettle Valley Telephone Line	5 00
Shields–Sheep Creek Trail	27 00
Renata–Bowman Trail	45 00
Green City–West Fork Trail	45 00
Sheep Creek Telephone Line	1 00
Evans Creek Trail	18 00
Duncan Valley Telephone Line	3 00
Duncan River Trail	103 00
	$ 300 00

Prince George.

Improvements—	
One power-speeder	$ 303 00
Four hand-speeders	252 00
Red Mountain Tool-house	36 00
Willow River Trail	933 00
Standard tool-kits	934 00
Goat River Cache	370 00
Stuart Lake Boat-house	62 00
Giscome Tool-cache	310 00
McBride Tool-house	22 00
Three fire-fighting pumps, equipped	2,295 00
	$ 5,517 00
Maintenance—	
Red Mountain Ranger Station Wood-shed	$ 43 00
Additional pump equipment	389 88
	$ 432 88

Prince Rupert.

Improvements—	
One Evinrude motor	$ 150 00
One Ford car	416 00
Two railway velocipedes	193 00
One power-speeder	312 00
Hazelton Speeder-house	60 00
One fire-fighting pump, equipped	757 60
	$ 1,888 60
Maintenance—	
Lakelse Telephone Line	$ 70 00

Vancouver.

Improvements—	
Myrtle Point Fire-break	$ 56 00
Lillooet River Rowboat	78 00
Tool-caches	61 00
Pemberton Meadows Tool-shed	83 00
Haslam Lake Rowboat	90 00
Lynn Creek Tool-box	20 00
Langley Prairie Telephone Line	9 00
Myrtle Point Trails Survey	19 00
Camp Fireplaces (Vancouver Island)	56 00
Six new Ford cars	2,667 00
One power-speeder (P.G.E.)	603 00
Five new launches	10,764 00
Five dinghies for above	185 00
Painting house, Myrtle Point	100 00
Dam at Myrtle Point	173 00
Thurston Bay Property-room	25 00
Felling snags on pipe-line, Thurston Bay	150 00
House at Thurston Bay	60 00
Ten fire-fighting pumps and equipment	7,650 00
	$22,849 00
Maintenance—	
Theodosia Trail	$ 201 00
Vancouver Island Trails	61 00
Englishman River Trail	166 00
Cowichan Lake Boat-house	33 00
Repairing tools	185 00
Myrtle Point Telephone Line	290 00
Additional pump equipment	4,084 67
	$ 5,020 67

Vernon.

Improvements—	
Little White Mountain Telephone Line	$ 156 00
Reiter Creek Trail	44 00
Three Ford cars	1,323 00
Two fire-fighting pumps and equipment	1,530 00
	$ 3,053 00
Maintenance—	
Little White Mountain Look-out	$ 14 00
B.X. Telephone Line	35 00
Additional pump equipment	557 23
	$ 606 23

REPORT OF THE COMMISSIONER OF GRAZING.

The past season on the open range was better than usual. The comparatively light winter was followed by a fairly early opening of the range season and the growth of the forage was excellent. This was also true of the hay-crops through most of the Interior, and in consequence there is a good supply of hay on hand for most of the stock in all communities, which is going into the winter in fair to excellent condition.

Authorization.

Authority was granted to graze the following numbers of the different classes of live stock on the Crown ranges during the 1921 season:—

District.	Cattle and Horses.	Sheep and Goats.
Cariboo	32,000	3,300
Cranbrook	2,500	10,000
Fort George	500	....
Kamloops	2,000	500
Nelson	2,000	200
Prince Rupert	300	....
Vancouver	200	....
Vernon (Nicola-Princeton)	15,000	5,000
Vernon (Okanagan-Similkameen)	5,500	5,000
Totals	60,000	24,000

The records to October 31st show that permits for the following numbers of stock have been applied for:—

District.	Cattle and Horses.	Sheep and Goats.
Cariboo	27,185	4,424
Cranbrook	1,449	1,000
Fort George	19	....
Kamloops	999	150
Nelson	1,377	385
Vernon	12,114	1,750
Totals	43,143	7,709

The amount of grazing fees collected for the period January 1st to November 30th is $10,393.49.

The heavy drop in cattle prices this year and the extreme difficulty experienced in disposing of the beef has been the cause of tardiness in the payment of grazing fees this year. Payments are, however, coming in now more rapidly than one month ago.

Organization.

By far the most important phase of the grazing administration from now on will be the active range-management work carried on in co-operation with the organized live-stock associations.

There are twenty-two organizations dealing with questions of range-control, but as many of these are really district organizations progress in real co-operative work out on the range has been slow. The near future will see the stockmen of each community within each district banded together in local organizations for active range-work.

The ultimate and only successful system of organization is one under which communities are organized to co-operate in the management of the particular Crown range used by the stock from each community. Such organizations will have the direct control of the stock on their respective ranges and all users will be required to observe any special rules established for each range. Local problems can be dealt with in each community and need not be referred outside unless they embody matters of interest to the industry at large.

A local organization should include all users of the particular unit of range used by its members. They should manage the stock on the range co-operatively and will deal with such questions as:—

Range Plans.—The division of the range into spring, summer, and fall range; the protection of any particular portions of the range to promote growth of forage, to save range for breeding cows, beef, etc.

Range Improvements.—Trails; dangerous mud-holes; fences; development of springs.

Stock Management.—The question of a particular breed for the range to secure beef of uniform quality and grade; the furnishing of bulls of that breed, either individually or by the association; the separation of the breeding cows during the breeding season; the special care of the beef animals to be marketed; the hire of herders needed for range-work.

These and other matters are vital, local problems to be dealt with by local associations only.

All associations should be affiliated with a district association, or, if deemed advisable, a delegate from each community association will form a District Advisory Board to deal with district problems and matters relating to the general welfare of the industry. Finally, each district association will appoint a member to act as its representative on a Provincial Advisory Board.

Associations for range-work must necessarily be small and include in their respective memberships the users of definite units of range where the problems of each unit are vital to the users thereof. Large associations are unwieldy in dealing with local problems. Those assembled at the meetings are seldom representative of the districts or any communities within them and consequently are not competent to deal with community questions.

The stockmen have not yet realized this, but there will, however, soon develop a realization that the small association is the only workable unit in the management and control of a range-stock business. The low price of beef, together with high operating costs, is causing the stockmen to look into the matter of organization with a view to securing better prices for their beef. The discussion has so far dealt with the establishment of central selling agencies, saleyards at strategic points, and has even considered reaching the consumer through killing and distributing facilities controlled by the stockmen. Nothing conclusive has been done, for the reason that a live interest on the part of the great majority of stockmen has not been aroused. An apathetic attitude prevails which leads each to expect the other to do the work. Too many feel that with the election of the officers of an association their interest and duty ends. The formation of a successful organization to market beef depends on the willingness of the producers to co-operate and on their full realization of what such co-operation means. It must mean to each real, live, active interest and work out on the range.

During the year 1920 15,836 head of beef cattle, valued at $1,821,000, were shipped into the Province, and in addition to this 1,214,809 lb. of beef and veal were imported. The above are importations from Canadian Provinces only. It will be seen from this that the British Columbia stockman has to deal with heavy outside competition. This competition has grown up not on account of better quality in the outside stock, but on account of the inaccessibility of the home-grown product.

The British Columbia stockmen have to contend with range conditions differing from those experienced on the ranges of the Prairie Provinces. The more rugged and timbered character of the local ranges render such preliminaries to marketing as locating and noting the condition of the beef throughout the open season, as well as the gathering of it when needed, more difficult than on open prairie range. Furthermore, as is very general nearly everywhere, the beef raised in all localities is not of uniform grade. This usually requires inspection before sales are made. These features of the marketing problem place the British Columbia stockman at a disadvantage which he can only overcome through organization and individual and collective activity out on the range.

The solution of the whole marketing problem lies in organization for active range-work, and work to that end must begin there and not in the establishment of central selling agencies to sell something which is largely inaccessible at the present day. While the stockmen are casting about for ways and means to better market conditions this office is constantly advocating local organization for range and stock management, and is preparing the way for the real active interest that is developing by undertaking and by urging all users to become active in suggesting and assisting in carrying out the range improvements under way and contemplated.

The success of these associations is assured by the "Grazing Act," which provides for the establishment of special rules for any unit of range having the force of law and the improvement of the range. The policy of encouraging communities to organize will be continued, and very

shortly will see all communities following the lead taken by such active associations as the Heffley Creek Stock Association, with its interest in co-operative range management and improvement, and the Okanagan Falls Association, which has committed itself to the ranging of a definite breed of beef animal.

RANGE IMPROVEMENTS.

The Grazing Office has been enabled during the past season to undertake many needed range improvements with the money available in the Range Improvement Fund. Wherever possible, this office has refrained from undertaking any work before notifying live-stock associations interested in the use of the range upon which the work is to be done. All range-users are encouraged to refer their suggestions for range-improvement work to the secretary of the association in which they are interested, to be listed and referred on to this office.

This, it is believed, is the correct attitude to take, as it not only awakens interest in the development of the range, but also enables the Department to secure the collective opinion of the range-users regarding the projects placed before the meetings. It would seem advisable to refrain from expending any part of the Range Improvement Fund in communities where the users fail to organize for range-management purposes.

The main improvement project carried out during the past grazing season was the fencing of the open range on the Lundbum Commonage near Merritt. This portion of the range comprises the early spring and late fall grazing-grounds needed by a large part of the stock raised in the vicinity of Merritt. It has been badly overgrazed in the past and without a fence there was no hope of its recovery even with herding.

After a reconnaissance survey had been made to determine the location of fences and water, the lines for the proposed fence were selected and marked and the matter fully discussed with the Nicola Stock-breeders' Association at regular meetings, both of the association members and also of the Advisory Board. It was decided to take advantage of the lakes, water-holes, and other advantageous features, and by constructing approximately 12 miles of fence divide the commonage and adjoining Crown range into three divisions. Tenders were called for the work and a local returned man was the successful tenderer, the total cost being $4,143.50.

Beginning with the season of 1922, it will be possible to introduce a rotation system of grazing on the spring and fall range controlled by this fence that will rapidly restore most of it to something like its former condition. Large portions of the range around the watering-places have been so badly depleted by overgrazing that very little vegetation except dandelions are growing on them. They have also become so badly infested with pocket-gophers that experimental poisoning is being planned in co-operation with the Department of Agriculture to eradicate these pests.

A small tract of the commonage range, protected entirely from grazing by a fence, is under observation in order that comparative data regarding the rate of recovery on badly overgrazed areas may be obtained.

At the suggestion of this office the Department of Public Works made a slight change in the Old Nicola Road, so that a spring could be fenced in with the main body of the commonage range. The cost of the runway constructed under the road to enable the stock to reach the water-trough was $55.50.

A small fence 1 mile in length was constructed between the Allen Grove and Keremeos Stock-ranges to stop drift from the latter to the former range. The wire was supplied by the Government and the work was done by an interested grazing permittee who has not yet submitted cost figures.

Several dangerous small lakes and mud-holes on Crown lands of the Heffley Stock-range have been fenced and safe runways to water provided. In consequence, further serious losses of stock through becoming mired in such places has been prevented. The work was done by the Heffley Creek Stock Association and charged to the Range Improvement Fund, the cost being $284.25.

Dangerous watering-places on the Lac la Hache and Nicola Ranges were fenced. All cost figures have not yet been received. The fencing of three lakes on the Nicola Range cost $223.85. The cost of six lakes will average about $75 each and on the average half a mile of fence is constructed in each case. Other places have been discovered and reported and are on the list for examination and fencing in 1922. An inspection of these places during the past season shows that losses of cattle are extremely heavy owing to being mired down in efforts to reach water.

Rendering these places safe, as well as developing other sources of water, will be a most important feature of the range-improvement work during the next few years.

The construction of stock-trails to remote sections of range is receiving attention. In most places overgrazing has so lowered the capacity of the front or near-by early ranges that the cattle must be taken back to the summer ranges proper during the midsummer months if the early range is to be restored to anything like its former condition. It is necessary, therefore, in a few cases that trails be opened up to enable the cattle to be drifted back.

An important trail was constructed from the Empire Valley to drift cattle to the ranges at the head of Churn Creek without the trouble of crossing and driving to the range by way of the north side of that creek. Proper use of this trail will mean the restoration in a satisfactory way of the very badly overgrazed low range of the valley, as well as the protection of the fall range north of Churn Creek. The cost of the above project was $259.50.

Another trail leading into the above ranges from the Williams meadow was authorized, but owing to changes in the personnel of the Cariboo District and the illness of the Acting District Forester it was not constructed until late in the year. The cost will approximate $150.

The field-work of the past three years has resulted in a very fair knowledge of the ranges being acquired, so that this office is now fairly well conversant with the needs of the range country in the matter of dividing lines which are being established between districts and the main division of district. A knowledge of this is necessary in order that the Range Improvement Fund may be allotted, and also that the stockmen may be properly organized for active range-work and be on an active and useful advisory basis regarding the expenditure of the Range Improvement Fund within their respective districts.

BURNING AND RESEEDING ON THE CROWN RANGES.

A very important phase of the range-improvement policy is that dealing with investigations into the advisability of burning and reseeding on the summer ranges. For the past three years this office has been making a study of the effect of fires on the forage-growth of Crown ranges. Growth conditions of timber and forage following fires indicate that it is inadvisable to permit fires to run over range country. This was dealt with in detail in a report on range-burning dated December 13th, 1920.

Since no very definite information regarding the permanent effect of such fires could be obtained without confining the study to special areas, several tracts of typical range have been selected for experimental work. These cover ranges where accidental burns have occurred and also where burning has actually been done for investigative purposes.

The reseeding-work with grasses and clovers also required the selection and establishment of experimental plots.

An examination of the reseeding-work done in 1919 on the 59-Mile burn with brome-grasses and orchard-grass or cocksfoot shows that the grasses have failed to establish themselves. The burn was a light one which merely cut down the old grass and small seedlings. The grasses were sown on the burn shortly after the fire occurred and made fair growth in the early part of 1920. The cultivated species could not compete with the native vegetation and consequently were choked out.

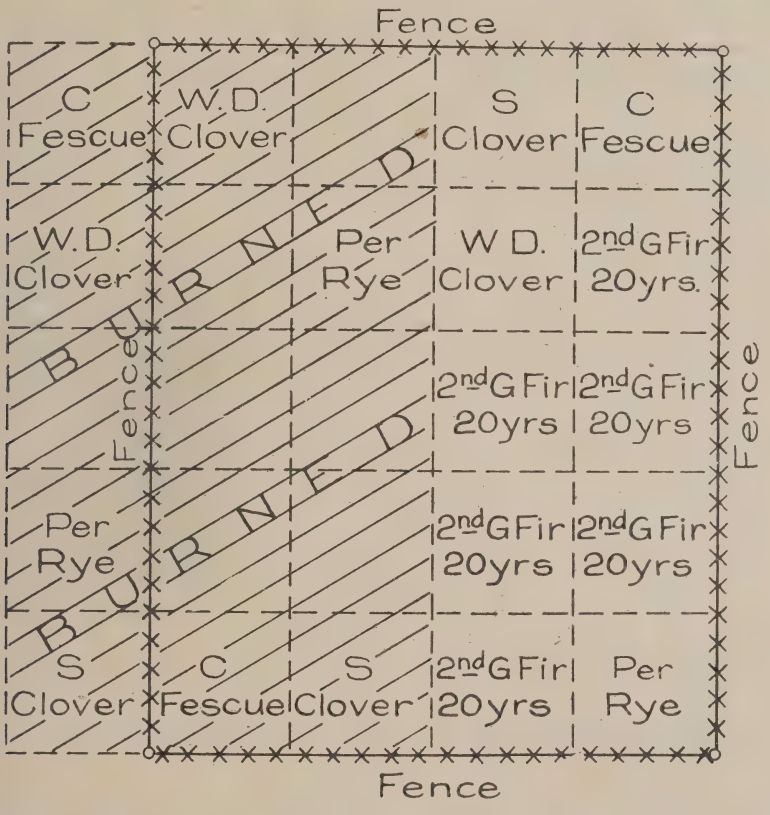
A small area on the Minnie Lake Commonage near Nicola was sown with the seed of the common bunch-grass (*Agropyron tenerum*) in 1919, but has shown no good results so far. The area was not protected in any way, but was left open to be grazed at all times stock were on the commonage. It is difficult to get good results unless plenty of seed is available, as the percentage of germination in the average lot of bunch-grass seed collected is a little better than 3 per cent.

In July of this year an area was selected for a range-burning experiment on the Lower Nicola Range after a conference with the Advisory Board of the Nicola Stock-breeders' Association and the users of the range unit involved. Controlled burning is the special feature of this experiment. The users of the range desired that it be burned over to clear off the reproduction which it was claimed was interfering with grazing. From an examination on the range with members of the association it did not appear that a general burn would be of any use, but it was deemed advisable to select a tract which was typical of the lower range of the district and burn it in such a way that definite information regarding growth figures could be obtained. The area embraced a stand of Douglas fir seedlings and saplings up to 20 years old and also areas of range entirely free of timber-growth.

As shown on the sketch which is made a part of this report, a portion of the tract was burned over to destroy the young seedlings and saplings and also to burn the growth of grasses and weeds remaining after the season's grazing on the open areas of the plot. Two acres were enclosed with a good fence, 1 acre being burned over and the other not. The following grass and clover seeds were sown both inside and outside of the fence on burned and unburned timbered and untimbered range: Chewing's fescue, perennial rye, white Dutch clover, and sweet clover.

Grasses, such as western wheat, which might be expected to give better results in range-sowing could not be obtained as they are classed as noxious weeds and importation prohibited.

This experiment will give important information relative to: The effect of the fire in retarding or influencing reproduction; the effect of the fire in retarding or influencing the growth of the forage on both open and timbered areas and the character of natural growth resulting; results following the sowing of the cultivated grasses on burned and unburned areas of both open and timbered land and comparative data in connection therewith.



After the burned saplings and seedlings fall naturally they will be burned on part of the area to ascertain the effect of a second fire on forage-growth.

The cost of the project, outside of time expended in examining the Lower Nicola Range and locating the area, was: Fencing, $40.95; grass and clover seed, $5; total, $45.95.

Another area was selected on the Lillooet Plateau and is located in the S.W. ¼ of the S.W. ½ of Lot 1687, Lillooet District. The tract was burned over in August of this year and was representative of the severe burns which occur in the lodge-pole and jack-pine types of range. All of the timber growing on the area was destroyed by fire and on the actual plot selected most of the down timber was destroyed. A very good seed-bed existed for the cultivated grasses and clovers sown. These were perennial rye, Chewing's fescue, white Dutch and sweet clovers.

A plot, 1 chain square was fenced with a strong pole fence and divided into four compartments, in each of which was sown one of the four species of cultivated forage mentioned. The

same grasses and clovers were sown on the open burn on the outside, each species being sown on separate areas. This experiment will give information regarding artificial reseeding on a severe burn where soil conditions are favourable and on areas protected and unprotected from grazing, and also information of value in reference to the growth of the native vegetation in competition with cultivated species will also be obtained.

In connection with this study the growth of reproduction will be carefully noted. Although the area was absolutely bare of reproduction owing to the severity of the fire, the cones of the large trees, which will probably die, were opening as a result of the heat from the fire and were showering seed on the tract at the time the experiment was established.

The cost of establishing this experiment, outside of one day and a half in time expended by members of this office, was: Grass and clover seed, $15; nails for fence, $1; total, $16.

A small supply of seed was furnished the Lillooet Stock-raisers' Association, which will be sown on cultivated land in the spring in the vicinity of Beaver Dam and near to the experimental plot. This sowing will furnish data for comparative purposes.

The above special experiments will be carefully observed at different times each year by members from this office and growth records and other data kept. Other experiments on different types of range will be established as time will permit. The two initiated this year, however, cover areas typical of the yellow-pine and lodge-pole types of range.

RESERVATIONS.

It is becoming evident that the reservation of small bodies of Crown range for the benefit of the range-stock industry of the Interior must be given increased attention. These reservations will cover areas needed for:—

Driveways.—From one portion of the Crown range to another and to shipping-points.

Watering-places.—Both for camp use and as stock-watering places.

Holding-grounds.—Particularly for beef cattle on the drive and close to shipping-points.

Reservations for the above purposes can generally be arranged to cover areas which are of no value for agricultural purposes and would not interfere with *bona-fide* settlement. Any discussion of settlement requirements would always recognize the fact that the major activity in sections of the country embracing such reservations is the range-stock industry, and that reservations are created for community and not for individual benefit.

In the range country the hay-producing lands are essentially lands which can only be successfully operated in connection with the raising of range cattle, and only then when a use of the open range is available. The cattle are on this open range from April to November and they make their biggest growth there. The hay lands (winter ranches) are absolutely dependent on the use allowed of the summer range, and therefore encouragement given the range stockman to develop his property will be an important factor in the success of the range-stock business of the Province. The successful development of the Interior depends in a very large degree on the proper control and management of the summer ranges.

All areas covered by applications to lease and purchase Crown range are carefully examined to ascertain whether their approval will result in blocking driveways and alienating sources of water needed by stock using adjoining range. In all cases where applications are disapproved for the above reason it would appear advisable to have the area involved listed as a reservation.

GRASSHOPPER-CONTROL.

The investigative work carried on by the Entomological Branch in co-operation with the Grazing Office for the purpose of discovering some method of preventing, or at least lessening, the damage done by grasshoppers on the range was continued during the past season.

The experiments of 1920 indicated that poisoning operations would not be successful. There are over sixty varieties of grasshoppers on the range, and apparently those doing the worst damage could not be checked by ordinary poisoning methods. It was deemed advisable to enclose a small area of the range to ascertain if complete protection from grazing would enable the grass to grow more rapidly than the grasshoppers could consume it. In this respect the experiment was a success, as there is a splendid growth of grass inside the fence, while on the outside where grazing was unregulated the forage was entirely consumed. The investigation disclosed the fact that owing to heavy grazing and the destruction by the grasshoppers the growth of forage was so sparse that the grasshoppers were forced to travel far for food. Under

such conditions it is not possible for their ordinary enemies to keep them down to normal numbers. In consequence they have rapidly increased.

The construction of drift-fences or the application of other range plans which will protect the forage to a great extent during the growing season will localize the grasshopper by making travel in search of feed unnecessary. The parasites and other enemies which prey on the grasshoppers will then be enabled to reach them and will keep them down to a point where the damage they do will not be so noticeable. The pasture established has served to demonstrate the truth of this, and it will now be used to secure data to indicate the period of time that must elapse before satisfactory restoration may be expected on the range and as a guide to forming working plans. The cost for this year's work to the Department was $328.22.

Depredations by grasshoppers in the Nicola District were unusually bad during the past season. It is understood the Entomological Branch intends to do considerable investigative work in that section in 1922. If this step is taken this office can materially assist, since it possesses first-hand knowledge of the location of the principal seed-beds of the grasshopper.

HERBARIUM.

The herbarium contains 860 specimens of mounted forage-plants; 792 specimens have been identified. Observations are made regarding their forage value and noted. The studies made on overgrazed areas give interesting information on the value of forage of the plants growing thereon, which enables this office to determine very closely the method of using any area to bring about the restoration of the primary forage-plants which are the most nutritious and palatable.

THOS. P. MACKENZIE,
Commissioner of Grazing.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1922.

RETURN

To Orders of the House showing the exact full terms and date of contract with the Northern Construction Company for Pacific Great Eastern work; how much has been paid under the contract; the unit prices for earth, loose rock, solid rock, ties, rails, and track-laying; on whose advice these unit prices were adopted; on what percentage of profit the contract was awarded; how much the contractors have received on the basis of this percentage profit; how much (if any) bonus the contractors have earned in addition to the percentage profit; how much they have received.

And that all contracts between the Pacific Great Eastern Railway Company and the Northern Construction Company for the completion of the railway to Prince George be laid on the table.

JOHN OLIVER,
Minister of Railways.

Department of Railways,
Victoria, B.C., October 28th, 1921.

CONTRACT BETWEEN PACIFIC GREAT EASTERN RAILWAY CO. AND NORTHERN CONSTRUCTION CO., WITH SCHEDULE OF PRICES, ETC.

THIS INDENTURE, made the twenty-eighth day of September, one thousand nine hundred and eighteen,

Between

THE NORTHERN CONSTRUCTION COMPANY, LIMITED (hereinafter called the Contractor), of the first part;

and

THE PACIFIC GREAT EASTERN RAILWAY COMPANY (hereinafter called "the Company") of the second part.

Witnesseth that the said parties hereto hereby covenant, promise, and agree, each with the other, as follows:—

Interpretation.

1. In this contract the word "work" or "works" shall, unless the context requires a different meaning, mean the whole of the work and material, matters and things required to be done, furnished, and performed by the Contractor in or under this contract. The word "Engineer" shall mean the Chief Engineer of the Department of Railways or his duly authorized agent or agents. The word "Contractor," or other words relative thereto or of like import, shall mean and include, irrespective of gender or number, the party or parties of the first part as above designated or described, jointly and severally, and their and each of their executors, administrators, curators, or successors. The word "Minister," or other words relative thereto or of like import, shall mean and include the Minister of Railways for the time being.

Work to be done.

2. The Contractor shall, in an efficient and economic manner, provide all team roads to reach and carry on the work, and all and every kind of labour, machinery, horses, mules, plant, materials, articles, and things necessary for the due execution and completion of all of the works set out or referred to in

the accepted tender, copy of which is hereunto annexed and letter in connection therewith, copies of which are hereunto annexed, and in the specifications therein referred to, and set out and referred to in the plans and drawings prepared and to be prepared for the purposes of the work, all of which documents shall be deemed to be a part of this contract, and shall make all reasonable necessary provisions to ensure the avoidance of damages or injury to persons, live stock, lands, buildings, structure, fences, trees, crops, roads, ways, properties, rights, privileges, and easements, of whatever description, in the carrying-on of the works or any part thereof, and shall forthwith commence the works, and diligently execute the respective portions thereof, and deliver the works complete in every particular to the Company on or before the date named in the said tender.

Time for completion.

Completion of portions of the work.

In the event of the Engineer so directing, the Contractor shall proceed with the work in such order as the Engineer shall specify, and the Contractor shall, at his own expense, commence, by such date and complete within such periods of time as the Engineer may specify with respect thereto, such special portion or portions of the works as the Engineer may from time to time direct.

Quality.

3. The works shall be constructed of the best material of their several kinds, and finished in the best and most workmanlike manner, and in the manner required by and in strict conformity with the said specifications, special specifications, and the plans and drawings relating thereto, and the working or detail drawings which may from time to time be furnished by the Minister or Engineer, all to the complete satisfaction of the Engineer.

Time deemed material.

4. Time shall be deemed the essence of this contract.

Extra work.

5. The Engineer may from time to time, before the final acceptance of the works, order in writing any extra work to be done, or omissions or changes to be made, which he may deem expedient, in or in respect of the works hereby contracted for, or the plan, character, quality, quantity, description, dimensions, location, or position thereof, or any parts or portions thereof, or in any material or things connected therewith, or used or intended to be used therein, whether or not the compliance with such orders increases or diminishes the work to be done, or the materials or things to be provided, or the cost of doing or providing the same, and the Engineer may also specify the time or times in which such orders shall in whole or in part be complied with. The decision of the Engineer on the question whether compliance with such orders increases or diminishes the cost of the work, and as to the prices applicable and the amounts to be paid or deducted, as the case may be, in respect therefor, shall be final, and the adjustments to be made in determining and comparing the actual cost with the estimated cost for purpose of ascertaining the commission and bonus (if any), and necessary because of anything done under this section, shall rest with the Engineer, whose decision shall be final.

Conditions precedent to payment.

As a condition precedent to payment in respect to such orders of the Engineer, the Contractor shall obtain and file, produce, and present:—

(*a.*) The orders in writing of the Chief Engineer or Division Engineer directing the work:

(*b.*) A certificate in writing from the Chief Engineer or Division Engineer showing compliance with such orders, and fixing the prices and the amounts to be paid or deducted in respect thereof.

Covenants herein apply to extra work.

6. All changes, addition, or extra work so ordered shall fall within and be governed by the terms and conditions of this contract, in like manner and to the same extent as the works contracted for.

Extra work.

6A. No extra work or material will be allowed or paid for except on previous orders in writing of the Chief Engineer. All accounts for work or

materials under this section or under section 5 shall be presented in detail by the Contractor to the Engineer within fifteen days after the end of the month in which such work is performed, or partly performed, or materials provided. If the account is passed in whole or part, the items passed shall be included in the Engineer's monthly certificates for the month in which such accounts were presented; that is, the month following the month in which such work is done. Any such accounts not presented within the period stipulated above shall be void. All accounts covering extra work must be returned to the Minister after being duly O.K.'d by the Engineer as to the amount of labour supplied by the Contractor and material used on such work.

Anticipated profits, no claim.

7. If any change or deviation in or omission from the works be made by which the amount of work to be done or materials or things supplied shall be decreased, no compensation shall be claimable by the Contractor for any loss of anticipated profits in respect thereof.

Engineer sole judge of work or material.

8. The Engineer shall be the sole judge of work and material in respect to both quality, quantity, and price, and his decision on all questions in dispute with regard thereto shall be final, and no work under this contract shall be deemed to have performed, nor materials or other things provided, so as to entitle the Contractor to payment therefor, until the Engineer is satisfied therewith, and has issued to the Contractor his certificate in writing in respect thereof.

His certificate condition precedent.

Work subject to control of Engineer.

9. The work shall, in every particular, be under and subject to the control and supervision of the Engineer, and all orders, directions, or instructions at any time given by the Engineer with respect thereto, or concerning the conduct thereof, shall be by the Contractor promptly and efficiently obeyed, performed, and complied with to the satisfaction of the Engineer.

Work subject to control of Engineer.

9A. In particular, and without limiting the foregoing, the Engineer shall have the right to control blasting operations, so as to protect the interests of the Company and to avoid injury or damage from excessive or improper blasting.

Schedule of prices.

What is included herein.

10. The respective descriptions of work and materials or portions of the works referred to in or covered by the individual items in the schedule of prices embodied in the tender annexed to this contract include not only the particular kinds of work or materials mentioned in the said items, but also all and every kind of work, labour, tools, plant, horses, mules, harness, materials, equipment, and things whatsoever necessary for the full execution, completion, and delivery, ready for use, of such descriptions of work and materials, or of such respective portions of the works, in accordance with the said drawings and specifications and to the satisfaction of the Engineer. The said schedule as a whole is designed to cover not only the particular descriptions of work and materials mentioned therein, but also all and every kind of work, labour, tools, horses, mules, harness, plant, material, equipment, and things whatsoever necessary to the full execution, completion, and delivery, finished and ready for use, of the entire work as herein contracted for, in accordance with the said drawings and specifications and to the satisfaction of the Engineer. In case of dispute as to what services, work, labour, tools, horses, mules, harness, plant, materials, equipment, and things are included in the works contracted for, or in the said schedule or any item thereof, the decision of the Engineer shall be final and conclusive.

Foreman of the works.

11. A competent foreman shall be kept on the ground by the Contractor during all working-hours to receive the orders of the Engineer, and should such foreman be deemed by the Engineer incompetent, or conduct himself improperly, he shall, on the request of the Engineer, be forthwith discharged and another

shall at once be appointed in his stead by the Contractor; such foreman shall be considered as the lawful representative of the Contractor, and shall have full power to carry out all requisitions and instructions of the Engineer, but this clause shall not relieve the Contractor from the duty of personally superintending the work, as part of the services in consideration of said commission.

Defective work or material.

12. Should the Contractor use or employ, or intend to use or employ, in or about the works any tools, plant, horses, mules, harness, materials, equipment, or things which, in the opinion of the Engineer, are not in accordance with the provisions of this contract, or are for any reason unsuitable for the works, or should the Engineer consider that any work is for any reason improperly, defectively, or insufficiently executed or performed, the Engineer may order the Contractor, at his own expense, to remove the same and to use and employ proper tools, horses, mules, harness, plant, materials, equipment, or things, or to properly re-execute and perform such work, as the case may be; should the Contractor fail to comply with such orders within twenty-four hours, the Engineer may at any time thereafter execute, or cause to be executed, the orders so given by him, and the Contractor shall, on demand, pay to the Company all costs, damages, and expenses incurred by the Engineer in respect thereof, or occasioned to the Company by reason of non-compliance by the Contractor with any such orders, or the Company may detain and deduct the amount of such costs, damages, and expenses from any amounts then or thereafter payable to the Contractor.

May require removal or re-execution.

Non-compliance by the contractor.

Contractor's machinery, plant, etc.

13. All machinery, tools, horses, mules, harness, plant, materials, equipment, and things whatsoever provided by the Contractor, or by the Engineer under the provisions of this contract, and not rejected under the provisions of section 12, shall from time to time of their being so provided and until the final completion of the works, and until a final settlement is made between the Contractor and the Company, be subject to a lien in favour of the Company for all purposes incidental to the completion of the works, and for security for any indebtedness to the Company, and the same shall on no account be taken away, or used or disposed of except for the purposes of the said works, without the consent in writing of the Engineer.

Subject to a lien for purposes of work.

Effect of completion.

The Company shall not be answerable for any loss or damage whatsoever which may at any time happen to such machinery, horses, mules, harness, tools, plant, materials, equipment, or things, or by reason of any defects therein or in the manner of using the same. Upon the completion of the works and upon a final settlement being made, and upon payment by the Contractor of all such moneys, loss, costs, and damages (if any) as shall be due from him to the Company, or be chargeable against the Contractor under this contract, such of the said machinery, horses, mules, harness, tools, plant, materials, equipment, and things as shall not have been used and converted in works or disposed of by the Company under powers contained in this contract shall, upon demand, be delivered to the Contractor in their then condition: Provided, however, that this section is subject to the provisions of the letters hereunto annexed and made part of this contract.

Insufficient workmen, plant, etc.

14. If the Engineer shall at any time consider the number of workmen, horses, mules, harness, quantity of machinery, tools, plant, equipment, or of proper material or things respectively employed or provided by the Contractor on or for the said works, to be insufficient for the advancement of such works or any part thereof towards the completion within the time limited in respect thereof, or that the works are, or some part thereof is, not being carried on with due diligence, the Engineer may, in writing, order the Contractor to employ or provide such additional workmen, horses, mules, harness, machinery, tools, plant, materials, or things as he may think necessary; and in case the Contractor shall not within three days, or such other longer period as may be

Work not proceeding with due diligence.

Engineer may provide additional at Contractor's expense.

fixed by any such order, in all respects comply therewith, the Engineer may provide and employ such additional workmen, horses, mules, harness, machinery, tools, plant, materials, equipment, and things respectively as he may think proper, and may pay such additional workmen such wages, and for such additional horses, mules, harness, machinery, tools, plant, materials, equipment, and things respectively, such prices as he may think proper, and all such amounts so paid shall be deemed to be paid as part of the obligations to be carried out by the Contractor under the terms of this contract and as if done and made by and with his request and consent and on his behalf. The Contractor shall employ the additional workmen, horses, mules, harness, machinery, tools, plant, materials, equipment, and things so provided and employed by the Engineer in the diligent advancement of the works; the workmen and horses so provided being thereafter exempt from discharge by the Contractor without the consent and approval of the Engineer.

Repayment by Contractor.

15. In case the Contractor makes default or delay in commencing or in diligently executing any of the works or parts or portions thereof to be performed or that may be ordered under this contract to the satisfaction of the Engineer, the Engineer may give a general notice in writing to the Contractor that he, the Contractor, has made such default; and should the Contractor during six (6) days (excluding Sundays) from the giving of such notice fail to remedy such default or delay to the satisfaction of the Engineer, or should the Contractor make default in completion of works or any portion thereof within the time limited with respect thereto in or under this Contract, or should the Contractor become insolvent, or indebted to the Company, or otherwise should fail to observe and perform any of the provisions of this contract, then and in any such cases the Company may take all the work out of the Contractor's hands and may employ such means as he may see fit to complete the works, and in such cases the Contractor shall have no claim for any further payment in respect of the work performed or to be performed, but shall be chargeable with and remain liable for all loss and damages which may be suffered by the Company by reasons of such default or the non-compliance by the Contractor of the works. All materials and things whatsoever and all horses, mules, harness, machinery, tools, plant, and equipment provided by the Contractor for the purposes of the works, or by the Engineer under the provisions of this Contract, shall be subject to a lien in favour of the Company for all purposes incidental to the completion of the works; and the Company may use and employ the same in such completion, and may sell or otherwise dispose of the whole or any portion of such materials and things, horses, mules, harness, machinery, tools, plant, and equipment at forced sale prices, and may retain the proceeds of such sale or disposition, and all other amounts then or thereafter payable by the Company to the Contractor under this contract, on account of or in part satisfaction of any loss or damage which it may sustain or may have sustained by reason aforesaid.

Default or delay by Contractor.

May take work out of the Contractor's hands.

Material, etc., remain property of Company.

Power of sale.

Set-off against damages.

16. When in this contract power or authority is given to the Minister or Company, or to any person on behalf of the Minister or Company, to take any action consequent upon the indebtedness or insolvency of the Contractor, or upon other defaults, neglects, delays, breaches, non-observance, or non-performance by the Contractor in respect of the works, or any portion or details thereof, such powers or authorities may be exercised not only in the event of the happenings of such contingencies before the time limited in this contract for the completion of the works, but also in the event of the same happening after the time so limited, in the case of the Contractor being permitted by the Engineer to further proceed with the execution of the works:

Provided always that after the expiration of the time limited for the completion of the works or any part thereof, the Engineer shall be the sole judge as to what additional time (if any) may be allowed the Contractor for

Power to take action on default of Contractor.

May be exercised during extensions of time limited for completion.

Engineer sole judge of reasonableness of extension of time limited for completion.

such completion, and his decision as to the reasonableness or sufficiency thereof for the purposes of completion shall be final and binding upon the Contractor.

Damages to the works.

17. The Chief Engineer may, in his discretion, by certificate in writing, at any time take over as completed any portion or portions of the work embraced in this contract prior to the completion of the whole work.

Delays.

18. The Contractor shall not have nor make any claim or demand, nor bring any action or suit against the Company for any damage which he may sustain by reason of any delay in the progress of the work.

Assignments, etc.

19. The Contractor shall not, without the written consent of the Minister, make any assignment of this contract, or any sub-contract, for the execution of any of the works hereby contracted for.

Supplies.

20. The Contractor agrees that all material and supplies used in and about the works shall be purchased within the Province of British Columbia, and from manufacturers, merchants, and dealers located and carrying on business within the Province, in so far as such purchases can be made upon terms and conditions equally favourable to those obtainable elsewhere.

Wages.

20A. The Contractor further agrees that the workmen and labourers employed in or about the works shall be paid such rates of wages as may be currently payable to workmen and labourers engaged in similar occupation in the Province.

The Minister or Engineer shall have the right to determine from time to time the number and classes of labourers, workmen, and officials to be employed and the wages or salaries to be paid, and to require and direct that any such be dismissed.

Labour.

20B. The Contractor further agrees that no Asiatic labour shall be employed on, in, or about the construction-work to be performed hereunder:

Provided, however, that this provision shall be construed so as not to be in any contravention of any Treaty now in force between Canada or Great Britain and any other country, or any Statute of Canada made pursuant thereto.

Medical attendance.

21. All the work carried on under this Agreement shall be subject to the provisions of the Act respecting the preservation of health on public works, and to all regulations made or to be hereafter made pursuant to the said Act, or by any other lawful authority, and applicable to such works. The Contractor shall make adequate arrangements for the medical and sanitary supervision of all his employees, and shall for that purpose employ the necessary duly qualified medical practitioner, furnish and provide all necessary medicine, surgical instruments, and hospital accommodation to the satisfaction of the Minister, and shall also at all times comply with and be subject to the provisions of the "Workmen's Compensation Act."

Damages to persons or property.

22. The Contractor shall be responsible for and shall indemnify the Company against all damages, by whomsoever claimable, in respect of any injury to persons, live stock, lands, buildings, structures, fences, trees, crops, roads, ways, properties, rights, privileges, or easements, of whatever description, occasioned in the carrying-on of the works, or any part thereof, by any neglect, misfeasance, or non-misfeasance on his part. The Minister may forthwith after notice to the Contractor pay or compromise any claim for such damages occasioned in the carrying-on of the works or any part thereof, and whether occasioned by any neglect, misfeasance, or non-misfeasance on the part of the Contractor or otherwise, and whether placed in suit or not, and may collect the amounts so paid from the Contractor or deduct the same from any amounts then or thereafter due by the Company to the Contractor, or charge the same against the actual cost of construction, as the case may be.

22A. The Contractor will so conduct his work as to avoid in any way interfering with the operation, use, or enjoyment of the adjacent railway property.

Inspection of books.

23. The Contractor's pay-rolls, time-books, and other books of account, and vouchers, invoices, and statements, shall be open for the inspection and extract by the authorized representative of the Minister or Company, who shall be assisted in every possible way by the Contractor to enable such representative to ascertain, as far as possible, the exact sums remaining unpaid. The Contractor shall be estopped from denying the accuracy and correctness of any payments made by the Minister or Company under this or the preceding section.

Estoppel.

Concurrent contracts.

24. The Minister or Company may send workmen upon the premises with all necessary tools, plant, material, horses, mules, harness, equipment, and things to do the work not comprised in this contract, and the Contractor shall afford to them all reasonable facilities, to the satisfaction of the Engineer.

Notice, how given.

25. Any notice, order, or other communication given to the Contractor under the provisions of this contract shall be sufficiently given if delivered to the Contractor personally, or to his foreman appointed under section 11 of this contract, or left at the Contractor's office, or mailed in any post-office to the Contractor or foreman addressed to the address mentioned in this contract, or to the Contractor's last-known place of business or residence. Every notice or order shall be sufficient which expresses in general language and without detail the matters required or communicated, or which follows the general language of the section or sections of this contract under which it is given, and no objection shall be taken to the form thereof.

Payments.

26. The Company covenants with the Contractor that the Contractor, having in all respects complied with the provisions of this contract, will be paid for and in respect of the works the various amounts to which he is entitled according to this contract and the accepted tender of the Contractor hereto annexed.

Monthly estimates.

27. Cash payments equal the value of the work done approximately estimated from the progress measurements and computed at the applicable schedule prices, or prices fixed with respect thereto, as the case may be, under the provisions of this contract, will be made to the Contractor monthly on the written certificate of the Engineer stating that the work for or on account of which the certificate is granted has been done, and stating the value of such work computed as above mentioned; and the said certificate shall be a condition precedent to the right of the Contractor to be so paid. The written certificate of the Engineer certifying to the final completion of the said works to his satisfaction shall be a condition precedent to the right of the Contractor to receive or to be paid his commission or bonus as provided under this contract.

Condition precedent to payment.

Outstanding claims for labour, etc.

28. Provided also that before making payment upon any progress or final estimate the Company may require the Contractor to satisfy the Engineer, or other authorized representatives of the Company, that all claims against the Contractor or any sub-contractor for labour, teams, plant, materials, or things employed, hired, or supplied upon or for the works have been paid or satisfied, or, if any such claims are found to exist, may at its option withhold from such payments sufficient amounts to satisfy the same, or may pay to the Contractor the amount due under such estimate in instalments, giving the Contractor from time to time such sums as he deems sufficient to meet such claims, and withholding the balance until the same are satisfied, or may pay all or any of such claims, rendering to the Contractor the balance due under such estimate after deducting the payments so made. All the covenants contained in section 23 of this contract respecting inspection and extract of and from the Contractor's books and papers, and assistance by and estoppel of the Contractor, shall apply to any action taken or situation arising under this section.

Company may withhold payment or pay Contractor in instalments, or pay the claim.

Inspection, assistance, and estoppel.

Claims under progress certificates.

29. It is intended that every allowance to which the Contractor is fairly entitled will be embraced in the Engineer's monthly certificates, but should the Contractor at any time have claims of any description which he considers are not included in the progress certificates, such claims must be made in writing to the Engineer within thirty days after the date of the delivery to him of the certificate from which he considers the items of such claims to have been omitted, but in no case beyond the period of sixty days from the date of the practical completion of the portion of the work to which such claims apply. And in default of the presentation of such claims within the time or times so limited such claims shall be absolutely barred.

Limitation of time for the presentation of claims.

Claims, evidence of accuracy.

30. The Contractor, in presenting claims of the kind referred to in section 30, must accompany them with satisfactory evidence of their accuracy and the reason why he thinks they should be allowed.

Progress estimates not binding.

31. The progress measurements and progress certificates shall not in any respect be taken as binding upon the Engineer, or as final measurements, or as fixing final amounts or quantities; they are to be subject to the revision of the Engineer in making up his final certificate, and they shall not in any respect be taken as an acceptance of the work or release of the Contractor from responsibility in respect thereof. No estimates or certificates given or payments made under this contract, except the final certificate or final payment, shall be conclusive evidence of the performance of this contract, either wholly or in part, nor be construed to be an acceptance of defective work or improper material.

Evidence.

Acceptance.

Company may suspend work.

32. The Company may from time to time delay or suspend operations under this contract, either upon the whole of the works or at any particular point or points. Should any such delay or suspension, in the opinion of the Engineer, unreasonably limit the time for the completion of the works, the Engineer may allow such additional time as to him may seem sufficient in extension of such time for completion, but no such delay or suspension shall vitiate this contract or any part hereof, or any security or obligation for the performance hereof, nor shall the Contractor be entitled to make any claim for damages by reason thereof. Upon the termination of such delay or suspension, the removal of the cause thereof, or upon the Contractor receiving notice from the Engineer requiring him to resume the work, he shall at once resume operations and diligently carry on the same.

No compensation to Contractor for delay.

Implied contracts negatived.

33. No implied contract of any kind whatsoever by or on behalf of the Company shall arise or be implied from anything in this contract contained, nor from any position or situation of the parties at any time, it being clearly understood that the express covenants and agreements herein contained made by the Company shall be the only covenants and agreements upon which any rights against the Minister may be founded.

Orders by Engineer's agent.

34. All orders, directions, instructions, or notices to be given or powers exercised by the Engineer under any section of this contract may be given or exercised by a duly and expressly authorized agent of the Engineer or of the Company; provided that no certificate involving the acceptance on behalf of the Company of any work whatsoever shall be valid or binding on the Company unless signed by the Chief Engineer.

Extension of time.

35. Any extension of time that may be granted to the Contractor shall be so granted and accepted without prejudice to any rights of the Company whatsoever under this contract, and no assent thereto on the part of the Contractor shall be necessary.

Waiver negatived.

36. No condoning, excusing, or overlooking by the Company or Minister, or any person acting on its or his behalf, on previous occasions, or breaches

or defaults similar to that for which any action is taken or power exercised, or forfeiture is claimed or enforced against the Contractor, shall be taken to operate as a waiver of any provisions of this contract, nor to defeat, affect, or prejudice in any particular the rights of the Company hereunder.

Contractor's information.

37. It is hereby declared and agreed to by the Contractor that this Agreement is made and entered into by him for the consideration herein expressed solely on his own knowledge and upon information derived from sources other than the Company or Minister, or their officers or agents, of and respecting the nature and formation of the property upon which the said work is to be done, or the character, quantities, or location of the material required to be removed, or to be used in forming the road-bed for the said railway, and that the Contractor does not rely upon any information given or statement made to him in connection with the said contract by the Minister or Company or any of his or its officers or agents. The Contractor further declares and agrees that the plans, maps, and profiles of the said work furnished by the Company and quantities estimated therefrom are approximate merely, and are subject to change and alteration as herein provided.

Inconsistency between contract and specifications.

38. In the event of any inconsistency between the aforegoing provisions and the provisions of the specifications hereto attached, the provisions of the aforegoing sections numbered 1 to 38 shall prevail.

In witness whereof this Agreement has been duly executed by the parties.

Signed, sealed, and delivered by the Contractor in the presence of—
(Sgd.) E. M. BOYD.

NORTHERN CONSTRUCTION COMPANY, LIMITED.
(Sgd.) A. R. MANN,
President.

[SEAL.]

The corporate seal of Pacific Great Eastern Railway Company was hereto affixed in the presence of—
(Sgd.) D. M. CAMPBELL.

PACIFIC GREAT EASTERN RAILWAY COMPANY.
(Sgd.) JOHN OLIVER,
Director.
(Sgd.) WALTER W. BAER,
Secretary.

[SEAL OF THE COMPANY.]

PACIFIC GREAT EASTERN RAILWAY COMPANY.

Proposal for Grading, Embankment, Protection, Track-laying, Ballasting, Fencing, Surfacing, Telegraph-line, Erection of Buildings, and all other Necessary Work in connection with a Single-track Railway, Complete with Station and Depot Grounds and all Necessary and other Appurtenant Tracks, from a Point at or near Mile 183 North of Squamish to a Point at or near Mile 225 North of Squamish; Length of Line, 42 Miles, approximate.

Location: British Columbia. Division: Clinton.

The undersigned hereby propose, and, if this proposal is accepted, agree to enter into a written contract, if required, with the Pacific Great Eastern Railway Company to supply all labour and material and complete all work according to the plans and directions of the Engineer for said Railway Company, in conformity with the specifications attached hereto, upon the terms and conditions of the contract prepared therefor, and within the time specified, as follows:—

(1.) For actual cost plus 5½ per cent., subject to the following conditions:—

(2.) The following schedule of prices represents our estimated cost. If on completion of the work it is found that the total cost exceeds our total estimated cost, exclusive of our commission, which would be arrived at by computing the final measurements at the following schedule of prices, then in such case we to receive 5½ per cent. on the estimated cost only.

(3.) Should it be found on completion of the work that a saving has been made—viz., that the work has cost less than our estimated cost—then in such case we to receive 25 per cent. of such saving in addition to our 5½ per cent. on actual cost.

Schedule of Prices.

Clearing	$ 100 00	per acre.
Grubbing, 7 acres	250 00	„
Common excavation, earth, 10,000 cu. yds.	40	per cu. yd.
Hard-pan or cemented gravel, 46,000 cu. yds.	60	„
Loose rock, 20,000 cu. yds.	60	„
Solid rock, 12,000 cu. yds.	1 50	„
Slips, slides, and overbreak in rock excavation	1 00	„
Extra haul per 100 ft. over 500 ft. free haul	02	„
Cleaning out slides in cuts, 5,000 cu. yds.	50	„
Riprap, hand-laid	3 00	„
Riprap, loose	2 00	„
Track-laying, 42 miles	1,000 00	per mile.
Train-filling, 15,000 cu. yds.	55	per cu. yd.
Ballasting, distributing over track, and putting under, up to 10-mile haul, 40,000 cu. yds.	60	„
Ballasting, overhaul over 10 miles	01	per mile.

All the above work to be completed on or before January 1st, 1919.

The information upon which this proposal is based was obtained by the proposer through his own sources of knowledge, and was not derived from any officer or agent of the Railway Company.

The Railway Company reserves the right to reject any and all bids, and, at its option, to require a satisfactory bond from the Contractor for faithful performance of the work.

The Railway Company shall be given preference at equal rates on all competitive shipments, and no such shipments will be routed via foreign lines without prior notice to its Traffic Department.

This proposal is made with the understanding that no free or reduced rates whatever will be given by the Company on account of this work, and that full tariff freight and passenger rates will be paid by the Contractor.

(Signature of Proposer) .....

(Address) .....

(Date) ....., 192 .

(Sheet No. 2.)

Side-surfacing with material taken from slopes, 25,000 cu. yds.	$ 0 50	per cu. yd.
Bridges, timber ex stringers in place, 1,000,000 F.B.M.	50 00	per M.F.B.M.
Bridges, stringers in place	55 00	„
Iron in bridges, 25,000 lb.	10	per lb.
Piling delivered, 30,000 lin. ft.	20	per lin. ft.
Piling driven, 25,000 lin. ft.	30	„
Pile-shoes	2 00	each.
Cattle-guards	45 00	per set.
Highway crossings in place	8 00	each.
Plank in crossings	40 00	per M.F.B.M.
Whistling-signs	4 00	each.
Warning-signs, No. 10	4 00	„
Flanger-signs	4 00	„
Mile-markers	1 00	„
Blind drains	2 50	per cu. yd.
Logs in culverts, flatted on two sides, 20,000 lin. ft.	20	per lin. ft.
Paving in culverts	3 00	per cu. yd.
Portable stations, standard	800 00	each.
Water-stations, 25,000 gallons	2,347 00	„
Water-stations, 40,000 gallons	4,574 00	„
Section-houses, cedar-post foundation	1,925 00	„
Tool-house, standard size	150 00	„
Privies, No. 2	145 00	„
Telephone or telegraph line, single wire, 42 miles	407 66	per mile.
Fencing, barbed wire, 4-strand, 4-point, 2-wire, 84 miles	437 17	„
Gates in place, 14 by 4 ft.	12 00	each.
Track-ties delivered, 80,000 ties	60	per tie.
Switch-ties delivered, 40,000 F.B.M.	40 00	per M.F.B.M.

The above quantities are merely approximate and are subject to change. All work to be done according to the Railway Company's standard plans.

(Signature of Proposer) NORTHERN CONSTRUCTION CO., LTD.
Per (Sd.) A. R. MANN,
President.

(Address) 921 Vancouver Block, Vancouver, B.C.

(Date) August 9th, 1918.

August 23rd, 1918.

Northern Construction Company,
Vancouver, B.C.

GENTLEMEN,—Referring to your letter of the 23rd inst. to the Honourable the Premier in connection with the furnishing of equipment for the work proposed to be done on the Pacific Great Eastern Railway, my understanding of the intent of this letter is as follows:—

First: Any shovels, donkeys, cars, or track necessary to do the work on the unfinished grade is to be supplied by you, rent free; transportation of the same from point of shipment to end of steel to be paid for by the Railway Company, the Railway Company undertaking to return any of the above equipment furnished in as good condition as when it was received.

Second: Any shortage of equipment for the lift or track-laying to be supplied on the same terms as No. 1.

Third: All other tools, supplies, etc., to be paid for in the following manner: (*a*) When bought, price of purchase to be sanctioned by the Engineer; (*b*) if now in your possession, to be valued by the Engineer before being put on the work, and paid for.

If these terms are acceptable, kindly advise by writing "accepted" across the face of this letter.

Yours truly,
(Sd.) A. F. PROCTOR,
Chief Engineer.

Accepted on behalf of the Northern Construction Co.
(Sgd.) J. A. MURDOCH.

To the Honourable the Premier, John Oliver,
Minister of Railways, Parliament Buildings, Victoria, B.C.

DEAR SIR,—Confirming our conversation of this morning, as requested by your Chief Engineer, Mr. A. F. Proctor, we beg to state that we, if awarded the contract for the P.G.E. work, will undertake to place on this work at our expense sufficient equipment to supplement what may be supplied by the Railway Company to carry out the work to the satisfaction of your Chief Engineer.

Yours very truly,
NORTHERN CONSTRUCTION CO., LTD.,
Per J. A. MURDOCH.

CORRESPONDENCE *RE* DECREASE AND INCREASE IN THE UNIT PRICES OF THE ORIGINAL CONTRACT.

A. R. Mann, Esq., March 11th, 1919.
President, Northern Construction Co., Vancouver, B.C.

RE UNIT PRICES.

DEAR SIR,—This is to remind you of the Hon. the Premier's request that, in view of the fall in the labour scale and the decline in price of some commodities, you should revise your unit prices on the work to be done north of 100-Mile, which is not yet touched, as at April 1st. The old unit prices will, of course, obtain on your original contract and on any work actually opened up and under way prior to April 1st, 1919.

Yours truly,
.....
Chief Engineer.

NORTHERN CONSTRUCTION CO., LIMITED,
VANCOUVER, CANADA, March 31st, 1919.

A. F. Proctor,
Chief Engineer, Department of Railways, Victoria, B.C.

DEAR SIR,—In accordance with the promise made to the Honourable the Premier and yourself, that, in view of the drop in labour scale and a decrease in price of some commodities, I would be willing to revise the unit prices which at present obtain on the work under contract from Clinton north by my Company, I now beg to submit a revised schedule as per attached list.

I am quite willing to admit that there has been quite an appreciable drop in the labour scale, but labour to-day cannot be classed as highly efficient, or even as averagely efficient.

I have given the whole matter very serious consideration, and feel that the new prices which I have submitted to you are as close at it is possible to make. and to keep within, in carrying out the work. It is understood that these prices will not apply to any work under way or under contract as at April 1st, but will obtain on all other work (exclusive of the original 42 miles) to be undertaken by my firm this year, from the end of the present contract to Soda Creek.

Yours truly,
(Sgd.) A. R. MANN,
President.

April 8th, 1919.

RE REVISION OF UNIT PRICES, P.G.E. CONSTRUCTION.

Memo. for the Hon. the Premier and Minister of Railways.

Replying to your memo. of April 4th in reference to the above, I beg to advise you that I have again been in communication with the Northern Construction Company, and have asked them whether it was possible to make any further revision on the unit prices submitted by them on March 31st.

They advise me that they have again gone very thoroughly into the matter, and find it is impossible to make further reduction, and also draw my attention to the fact that the price for ballasting on the P.G.E. is only 5 per cent. higher per cubic yard than paid in 1910 and 1912 on the Canadian Northern under entirely different conditions as to labour, material, and supplies. I am not at all surprised at the inability of the Construction Company to further revise their figures. In fact, this was forseen by me, as you will note in my memo. to you of the 1st inst., wherein I stated: "I do not see where the revision as to prices could be carried further than it has been."

I have accordingly advised the Northern Construction Company to-day to proceed with further construction as far as Soda Creek on the basis of the prices submitted on March 31st.

I attach copy of letter written to the Northern Construction Company.

.....

Chief Engineer.

PACIFIC GREAT EASTERN RAILWAY COMPANY.

Proposal for Grading, Embankment, Protection, Track-laying, Ballasting, Fencing, Surfacing, Telegraph-line, Erection of Buildings, and all other Necessary Work in connection with a Single-track Railway, Complete with Station and Depot Grounds, and all Necessary and other Appurtenant Tracks, from a Point at or near Mile 183 North of Squamish to a Point at or near Mile 225 North of Squamish; Length of Line, 42 miles approximate.

Location: British Columbia. Division: Clinton.

The undersigned hereby propose, and, if this proposal is accepted, agree to enter into a written contract, if required, with the Pacific Great Eastern Railway Company to supply all labour and material, and complete all work according to the plans and directions of the Engineer for the said Railway Company, in conformity with the specifications attached hereto, upon the terms and conditions of the contract prepared therefor, and within the time specified, as follows:—

(1.) For actual cost plus 5½ per cent., subject to the following conditions:—

(2.) The following schedule of prices represents our estimated cost. If on completion of the work it is found that the total cost exceeds our total estimated cost, exclusive of our commission, which would be arrived at by computing the final measurements at the following schedule of prices, then in such case we to receive 5½ per cent. on the estimated cost only.

(3.) Should it be found on completion of the work that a saving has been made—viz., that the work has cost less than our estimated cost—then in such case we to receive 25 per cent. of such saving in addition to our 5½ per cent. on actual cost.

Schedule of Prices.

	Old Scale.	Revised Scale.
Clearing	$ 100 00 per acre	.....
Grubbing, 7 acres	250 00 „	.....
Common excavation, earth, 10,000 cu. yds.	40 per cu. yd.	$ 0 35
Hard-pan or cemented gravel, 46,000 cu. yds.	60 „	57
Loose rock, 20,000 cu. yds.	60 „	57
Solid rock, 12,000 cu. yds.	1 50 „	1 45
Slips, slides, and overbreak in rock excavation	1 00 „	.....
Extra haul per 100 ft. over 500 ft. free haul	02 „	.....
Cleaning out slides in cuts, 5,000 cu. yds.	50 „	.....
Riprap, hand-laid	3 00 „	.....

Schedule of Prices—Continued.

	Old Scale.	Revised Scale.
Rip-rap, loose	$ 2 00 per cu. yd.	.....
Track-laying, 42 miles	1,000 00 per mile	$965 00
Train-filling, 15,000 cu. yds.	55 per cu. yd.	.....
Ballasting, distributing over track, and putting 40,000 cu. yds. under, up to 10-mile haul	60 „	.....
Ballasting, overhaul over 10 miles	01 per mile	.....
Side-surfacing with material taken from slopes, 25,000 cu. yds.	0 50 per cu. yd.	.....
Bridges, timber ex stringers in place, 1,000,000 F.B.M.	50 00 per F.B.M.	.....
Bridges, stringers in place	55 00 „	.....
Iron in bridges, 25,000 lb.	10 „	.....
Piling delivered, 30,000 lin. ft.	20 per lin. ft.	.....
Piling driven, 25,000 lin. ft.	30 „	.....
Pile-shoes	2 00 each	.....
Cattle-guards	45 00 per set	.....
Highway crossings in place	8 00 each	.....
Plank in crossing	40 00 per F.B.M.	.....
Whistling-signs	4 00 each	.....
Warning-signs, No. 10	4 00 „	.....
Flanger-signs	4 00 „	.....
Mile-markers	1 00 „	.....
Blind drains	2 50 per cu. yd.	.....
Logs in culverts, flatted on two sides, 20,000 lin. ft.	20 per lin. ft.	.....
Paving in culverts	3 00 per cu. yd.	.....
Portable stations, standard	800 00 each	.....
Water-stations, 25,000 gallons	2,347 00 „	.....
Water-stations, 40,000 gallons	4,574 00 „	.....
Section-houses, cedar-post foundation	1,925 00 „	.....
Tool-house, standard size	150 00 „	.....
Privies, No. 2	145 00 „	.....
Telephone or telegraph line, single wire, 42 miles	407 66 per mile	.....
Rock-holes	6 00 each	.....
Fencing, barbed wire, 4-strand, 4-point, 2-wire, 84 miles	437 17 per mile	.....
Gates in place, 14 by 4 ft.	12 00 each	.....
Track-ties delivered, 80,000 ties	60 per tie	.....
Switch-ties delivered, 40,000 F.B.M.	40 00 per F.B.M.	.....

The above quantities are merely approximate and are subject to change. All work to be done according to the Railway Company's standard plans.

(Signature of Proposer) NORTHERN CONSTRUCTION CO., LTD.
Per (Sgd.) A. R. MANN,
President.

(Address) 921 Vancouver Block, Vancouver, B.C.

(Date) August 9th, 1918.

Vancouver, B.C., March 31st, 1919.

(Sgd.) A. R. MANN.

July 30th, 1920.

MEMO. TO THE HON. THE PREMIER.

Attached please find copy of letter and supporting documents from the Northern Construction Company requesting a revision of prices.

I have been expecting for several months past that this question would be raised, as I had previously noted that the work could not be done for the unit prices in view of the very large increase of practically everything entering into railway-construction costs.

You will note that labour has increased 37½ per cent.; supplies (other than explosives), 24 per cent.; timber, 50 per cent.; and hay and oats, 35 per cent., since the revised prices were made effective on April 1st, 1919, which prices were to hold good till December 31st, 1919. (*See* attached copies of letters.)

These revised prices, you will remember, were established only after various meetings and correspondence, and were recommended by me for acceptance as I considered they were as close as it was possible to make them under conditions then obtaining.

The Construction Company draws my attention to the fact that the conditions under which they met our request for a revision downward of prices only continued till September 1st, 1919, when labour, material, and supplies rose in price, as they have set forth.

It is impossible, I think, and it would be unfair to ignore the circumstances, and I recommend that the increased cost in carrying out the various classes of work incidental to finishing the line be offset by allowing an increase in the unit prices of 30 per cent. as from January 1st, 1920, with the distinct understanding that should a decrease or increase in the price of labour or commodities occur in the future the unit prices be adjusted accordingly on demand by the Railway Company.

Unit price, work done as at January 1st, 1920	$1,373,729 35
Unit price, work done as at June 30th, 1920	2,701,580 75

The amount of work done this year—viz., $1,327,851.40—has been carried out under the following increases over costs as at April 1st, 1919:—

Labour	37½ per cent.
Supplies	24 „
Timber	50 „
Hay and oats	35 „
Explosives	Constant.

This $1,327,851.40 is approximately made up as follows:—

Labour	$ 637,851 40
Supplies	460,000 00
Explosives	80,000 00
Timber	150,000 00
Total	$1,327,851 40

These various quantities, calculated in the terms of the increases noted, produce the original cost of the various items as follows:—

Labour	$ 463,891 90
Supplies	370,967 75
Explosives	80,000 00
Timber	100,000 00
Total	$1,014,858 65

This shows that the work this year to date has cost $312,993 more than it would have cost had the price of labour and commodities remained as at April, 1919, or an increase of 30.8 per cent.

I will be pleased to receive your instructions.

Yours truly,

.....

Chief Engineer.

NORTHERN CONSTRUCTION CO., LIMITED,
VANCOUVER, CANADA, July 28th, 1920.

A. F. Proctor, Esq.,
Chief Engineer, Department of Railways,
Victoria, B.C.

PACIFIC GREAT EASTERN CONSTRUCTION.

DEAR SIR,—When the President of our Company on the 23rd inst. drew the attention of the Hon. the Minister of Railways and yourself to the fact that when a revision of prices on the above construction was requested by you, made by us and became effective on April 1st, 1919, a drop in the labour scale and in the prices of some commodities had actually occurred.

It was anticipated by our Company at that date that the prices for both labour and material would hold about constant, or perhaps have a tendency to further decline. Instead of this condition existing, however, the price of both labour and material has advanced to such a large extent that we feel obliged to bring for your consideration a request for a revision of unit prices. We are enclosing a statement showing the fluctuation in labour, material, and supplies at various dates, so that you may have an accurate basis on which to deal with our request.

It is impossible to hold to the unit prices now existing under conditions which have prevailed as from September 1st, 1919. You will note that the conditions which obtained when the revised prices were made effective on April 1st, 1919, only continued for the months of April, May, June, July, and August of that year.

Yours very truly,
(Sgd.) C. V. CUMMINGS,
Vice-President.

Vancouver, B.C., July 27th, 1920.

Supplies only required for 100 Men for One Month, P.G.E. Railway.

	Quantity.	March, 1919.		July, 1920.	
		Price.	Amount.	Price.	Amount.
Beef	3,750	$17 50	$656 25	$15 00	$562 50
Bacon	400	42	168 00	44	176 00
Butter	450	48	216 00	56½	254 25
Beans	150	06¾	10 13	07	10 50
Barley	100	06	6 00	08½	8 50
Baking-powder	60	17½	10 50	17½	10 50
Baking-soda	40	4 00	2 67	4 30	2 87
Beans (gallon), doz	6	2 35	14 10	2 00	12 00
Apples (gallon), doz	7	5 25	36 75	6 75	47 25
Apricots (gallon), doz	4	8 25	3 00	11 50	46 00
Apples, evaporated	50	21	10 50	25	12 50
Apricots, evaporated	40	20½	8 20	39	15 60
Allspice, oz	4	17	04	28	07
Cheese	90	32	28 80	32½	29 25
Corn-meal	40	5 80	2 32	6 40	3 72
Coffee	225	41 80	94 05	41 80	94 05
Carrots	900	1 70	15 30	03½	31 50
Cabbage	480	02½	12 00	03	14 40
Catsup (gallons)	15	7 25	18 12	6 75	16 87
Chocolate	10	39	3 90	53	5 30
Corn-starch	50	10½	5 25	13¼	6 63
Cocoanut	10	25	2 50	37	3 70
Currants	40	18	7 20	23	9 20
Chloride of lime	1	5 75	5 75	6 50	6 50
Corn, 2's, doz	21	2 35	49 35	2 00	42 00
Cloves, oz	4	9 50	20	90	23
Cream of tartar, oz	2	1 10	14	80	10
Curry, oz	8	45	23	50	25
Cinnamon, oz	4	40	10	45	11
Eggs, doz	300	55	165 00	54	162 00
Extracts, flavouring, 2/32	....	8 00	1 67	8 00	1 33
Flour	2,000	10 90	218 00	14 65	293 00
Figs	20	24	4 80	15½	3 10
Ginger, oz	5	42	13	42	13
Gold Dust	3	6 15	18 45	7 80	23 40
Ham	350	32	112 00	43	150 50
Jam	100	15	15 00	24	24 00
Lard	275	24 80	68 20	27 80	76 45
Lye	1	6 25	6 25	7 45	7 45
Molasses	5	60	3 00	75	3 75
Milk	15	5 25	78 75	5 65	84 75
Mince-meat	50	14½	7 25	21	10 50
Macaroni	50	12	6 00	15	7 50
Matches	1	7 50	7 50	7 75	7 75
Mustard, oz	10	40	25	75	47
Nutmeg, oz	8	50	35	65	32
Oil (coal)	5	20½	1 02	26½	1 32
Onions	350	03	10 50	03½	12 25
Oats (rolled)	200	4 35	8 70	5 45	10 90
Potatoes	4,000	40 00	80 00	160 00	320 00
Parsnips	480	1 70	8 16	04	19 20
Pickles (gallon)	8	1 31	10 48	1 20	9 60
Peas (split)	30	08	2 40	11	3 30
Peas (dried)	80	05¼	4 20	07½	6 00
Pumpkin, 2's	10	2 25	22 50	1 50	15 00
Plums (gallon)	3	6 50	19 50	7 50	22 50
Pears (gallon)	5	8 25	41 25	11 00	55 00
Peaches (gallon)	6	8 50	51 00	11 50	69 00
Pineapple (gallon)	1	9 00	9 00	14 50	14 50
Peaches, evaporated	75	24½	18 38	25½	19 13
Prunes, evaporated	100	14	14 00	14½	14 75
Pepper, black, oz	10	33	21	48	30
Pepper, cayenne, oz	4	30	07	40	10
Rice	100	10¾	10 75	13¼	13 25
Raisins	60	13	7 80	27	16 20
Sugar	1,600	10 45	167 20	23 00	368 00
Syrup	8	1 10	8 80	1 68	13 44
Sage	60	09½	5 70	09¾	5 85
Spaghetti	50	12	6 00	15	7 50
Salt	180	1 72½	3 10	1 00	1 80
Soap, laundry	1	7 50	7 50	7 10	7 10
Sage, oz	10	5 00	41	45	28
Soda biscuits	100	16	16 00	19	19 00
Turnips	750	1 70	12 75	2 00	15 00
Tapicoa	50	10	5 00	10	5 00
Tomatoes (gallon)	7	6 25	43 75	7 50	52 50
Peas, 2's	11	2 00	22 00	2 30	25 30
Tea	100	37	37 00	45	45 00
Vinegar	10	35	3 50	40	4 00
Yeast-cake	3	1 75	5 25	1 85	5 55
Totals	....	....	$2,803 73	....	$3,476 37

Note.—July, 1920, shows an increase of approximately 24 per cent. over April, 1919.

COMPARATIVE COST PRICES OF VARIOUS COMMODITIES AT DIFFERENT DATES, AS FOLLOWS.

	April, 1919.	July, 1920.
Timber and lumber—		
Bridge timber and lumber	$22 50	$36 00
Bridge stringers	30 00	43 00
Bridge-iron—		
Machine-bolts	06¼	07¼
Drifts and dowels	05½	06½
Washers and separators	04¾	06
Nails	6 10	7 75
Hay	35 00	47 00
Oats	59 50	82 00

VANCOUVER, B.C., July 28th, 1920.

RATE OF WAGES PAID LABOUR ON P.G.E. RAILWAY.

March, 1919 ..... 40 cents per hour.
March, 1920 ..... 55 „ „

1920 as compared with March, 1919, shows an increase of 37½ per cent.

STR. "PRINCE RUPERT," August 24th, 1920.

A. F. Proctor, C.E.

RE UNIT PRICES, P.G.E. RAILWAY CONSTRUCTION ACCOUNT.

DEAR SIR,—I beg to advise you that unit prices for this year's work will be arrived at as follows: As the unit prices agreed upon for construction during the period April to December, 1919, inclusive, are to the actual cost during that period, so will the unit prices be to the actual cost of construction during the year 1920. The directors are unanimous in this conclusion, and this principle will govern until varied by mutual agreement or is cancelled by either party. I am forwarding a copy of this letter to the Northern Construction Company.

I am,
Yours truly,
(Sgd.) JOHN OLIVER.

October 5th, 1920.

MEMO. TO THE HON. THE PREMIER.

In reply to your memo. of August 24th *re* unit prices to obtain on Pacific Great Eastern construction for 1920, I have consistently maintained that the unit prices for 1919 were just about the actual cost of carrying out the work. In support of this, I beg to draw your attention to my letter to you of June 18th, 1919. Consequently, therefore, I am strongly of the opinion that the increase of 30 per cent. recommended by me in my memo. to you of July 30th is the only fair action that can be taken by the Railway Company in this dealing with the Contractors in reference to this year's construction.

Unless advised by you to the contrary, I am treating all this year's estimates on this basis and have advised the Contractors to this effect, and I am sending them a schedule of prices which will obtain on all this year's work, revised in accordance with this letter.

Yours truly,
(Sgd.) A. F. PROCTOR,
Chief Engineer.

June 18th, 1919.

Re P.G.E. Construction, Chasm North.

Memo. for the Hon. the Premier and Minister of Railways.

Attached please find for your approval estimates in triplicate for the month of May, 1919, amounting to $124,938.09, in favour of the Northern Construction Company, in connection with the above work.

You will note that the work now shows that it is being done for about $9,500 less than the unit prices plus the percentage. I do not believe, however, that there will be at any time a much more favourable statement than this one, and if the work winds up at the end of the year showing up very much better than this, I will be agreeably surprised.

A. F. Proctor,
Chief Engineer.

October 5th, 1920.

The Northern Construction Co.,
Foot of Carrall St., Vancouver, B.C.

Dear Sirs,—Attached please find copy of memo. writen to the Hon. the Premier in connection with unit prices on your work, and also revised schedule outlining these unit prices which will obtain on the work you have carried out this year and will govern for the balance of 1920. Items not referred to will remain as they were.

Yours truly,
(Sgd.) A. F. Proctor,
Chief Engineer.

Victoria, B.C., October 5th, 1920.

Schedule of Unit Prices referred to in Attached Letter.

Grubbing	$ 325 00 per acre.
Common excavation	45 per cu. yd.
Hard-pan or cemented gravel	74 „
Loose rock	74 „
Solid rock	1 88 „
Rock overbreak	1 30 „
Cleaning out slides and cuts	65 „
Riprap, hand-laid	3 90 „
Riprap, loose	2 60 „
Track-laying	1,255 00 per mile.
Train-filling	71 per cu. yd.
Ballasting (up to 10-mile haul)	78 „
Side-surfacing	65 „
Bridges, timber	78 00 per M. ft. B.M.
Bridges, stringers	84 50 „
Bridges, iron and reinforcing steel	13 per lb.
Piling delivered	26 per lin. ft.
Piling driven	39 „
Cattle-guards	58 50 each.
Highway crossings	10 40 „
Plank in crossings	52 00 per M. ft. B.M.
Whistling-signs	5 20 each.
Warning-signs, No. 10	5 20 „
Flanger-signs	5 20 „
Mile-markers	1 30 „
Blind drains	3 25 per cu. yd.
Logs in culverts	26 per lin. ft.
Paving in culverts	3 90 per cu. yd.
Portable stations	1,040 00 each.

SCHEDULE OF UNIT PRICES—*Continued.*

Water-stations, 40,000 gallons	$ 5,946 00	each.
Section-houses (cedar-post foundation)	2,500 00	„
Tool-houses (standard size)	195 00	„
Privies	190 00	„
Telephone or telegraph line (single wire)	530 00	per mile.
Rock-holes	7 80	each.
Fencing, barb wire	570 00	per mile.
Gates in place	15 60	each.
Track-ties delivered	78	„
Switch-ties delivered	52 00	per M. ft. B.M.

March 31st, 1921.

The Hon. the Premier,
Government Buildings, Victoria, B.C.

DEAR SIR,—In response to a request of Mr. Proctor for a statement as to how much we are prepared to reduce the prices of 1921 to obtain on the work of completing the Pacific Great Eastern to Prince George during the current year, we are of the opinion, after careful consideration, that a uniform reduction of the increase granted in 1920 of 50 per cent. will meet the situation as it exists to-day.

In support of this, I might mention that we are paying common labour at the present time 45 cents per hour, as against 55 cents prevailing in 1920, which is a reduction of approximately 18 per cent., but it has been our experience for a number of years that the rates of common labour invariably advance in midsummer or at harvest-time.

As regards wages for carpenters, engineers, etc., no reduction from 1920 has taken place, but we are endeavouring to get a reduction on this class of labour in the neighbourhood of 15 per cent., but the unions are objecting very strongly to any reduction in their rates.

Supplies have reduced by amounts varying from 15 per cent. to 20 per cent. of the wholesale price, but due to the fact that the greater portion of our construction this coming summer will be from Prince George south, entailing excessive freight charges on such supplies, will result in their being practically no reduction in the delivered cost of same.

There is approximately 9,000,000 feet of timber to be erected in bridges, 5,000,000 feet of which we have delivered during the winter months at the higher costs and on which we will be unable to stand any reduction, but for the balance of the timber we will be agreeable to the general reduction applying.

Trusting this will meet with your approval.

We are,
Yours very truly,
NORTHERN CONSTRUCTION CO., LTD.
C. V. CUMMINGS,
Vice-President.

NORTHERN CONSTRUCTION CO., LTD.,
VANCOUVER, B.C., April 6th, 1921.

A. F. Proctor, Esq.,
Chief Engineer, Department of Railways,
Victoria, B.C.

DEAR SIR,—Further to my conversation with the Hon. the Premier and yourself regarding a revision of unit prices to obtain during 1921 for the completion of the Pacific Great Eastern Railway to Prince George, we are agreeable to accepting the unit prices which were established in 1918 and in effect to April 1st, 1919, with the exception of the prices of $60 and $65 which were set for bridge timber and stringers, respectively, from Deep Creek to Prince George; as a

large quantity of the material required for the completing of the bridges to Prince George is now on hand and was delivered during 1920 at the peak of prices, it is understood that an equitable adjustment on these items will be arranged when you have secured the necessary information from your Engineers to make the adjustment.

Yours very truly,

NORTHERN CONSTRUCTION CO., LTD.
C. V. CUMMINGS,
Vice-President.

April 6th, 1921.

C. V. Cummings, Esq.,
Vice-President, Northern Construction Co.,
Vancouver, B.C.

DEAR SIRS,—I am in receipt of your letter of even date, advising your acceptance of the unit prices obtaining on your contract in 1918 to apply during the present year on the work necessary to complete the P.G.E. line to Prince George, with the exception of the prices covering bridge timber and stringers. As I have advised you, I have written to Assistant Engineer Bright for detailed account of the timber we have on hand, and as soon as I have this account in my hands I am prepared to make an equitable adjustment on these particular unit prices to obtain for this year in connection with your work.

I expect to have this information in about a week's time, when I will promptly advise you as to my decision.

Yours truly,
(Sgd.) A. F. PROCTOR,
Chief Engineer.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1922.

RETURN

Of Moneys received and paid by the Official Administrators of the Province as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

JOHN HART,
Minister of Finance.

Treasury, February 14th, 1922.

ATLIN MINING DIVISION.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1921, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF THADEE OBALSKI.

1921.		
July 5.	To Corporation of West Vancouver	$ 11 53

ESTATE OF FREDERICK W. MARKUS.

1921.		
July 18.	To Refunds, Gold Commissioner	$ 35 00
Sept. 21.	„ „	5 00
Nov. 24.	Refunds, Official Administrator	11 50

ESTATE OF CHARLES L. QUEEN.

1921.		
July 9.	To Workmen's Compensation Board	$ 11 16
Sept. 24.	Refunds, Gold Commissioner	10 00
Oct. 10.	Deposit on four placer-mining leases	80 00
Dec. 22.	Filing declaration of consolidation of two leases	1 00
	Fee in lieu of development-work on two leases	125 00
	Recording payment in lieu of development-work	2 50
	Rental on two leases	50 00

ESTATE OF LEWIS C. CLARK.

1921.		
July 18.	To Refunds, Gold Commissioner	$ 22 50
Sept. 21.	„ „	35 00

ESTATE OF PATRICK KENNEDY.

1921.		
Oct. 17.	To Fisher & Oughton	$ 276 45

ESTATE OF AXEL SWANSON.

1921.		
Sept. 24.	To Refunds, Gold Commissioner	$ 5 00

ESTATE OF CHARLES PETITT.

1921.		
Sept. 21.	To Refunds, Gold Commissioner	$ 5 00

ESTATE OF JOHN EDWARD FOX.

1921.		
Feb. 4.	To Village of Cudworth	$ 12 05
Oct. 25.	„ „	13 00

ESTATE OF J. ELLWOOD SIMONS.

1921.		
Feb. 8.	To William Morrison	$ 73 00

CR.

ESTATE OF CHARLES L. QUEEN.

1921.		
Sept. 20.	By Cash	$ 110 00

ESTATE OF PATRICK KENNEDY.

1921.		
Oct. 17.	By Deposit	$ 117 50

ESTATE OF CHARLES PETITT.

1921.		
Nov. 3.	By Cash	$ 6 00

ESTATE OF DANIEL SULLIVAN.

1921.		
Oct. 23.	By Deposit	$ 150 00

ESTATE OF JOHN EDWARD FOX.

1921.		
Jan. 4.	By Cash	$ 5 00
Jan. 8.	„	4 50
Mar. 16.	„	10 00
April 11.	„	3 30
May 2.	„	5 00
June 7.	„	2 50

ESTATE OF CHRIS. H. NISSON.

1921.		
April 11.	By Cash	$ 10 00
Aug. 5.	„	10 00

J. A. FRASER,
Official Administrator.

CARIBOO ELECTORAL DISTRICT.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1921, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF GUS ANDERSON.

1921.			
Mar. 10.	To Commissioner	$ 2	14
Mar. 15.	E. J. Avison	11	70
April 20.	Prince George Undertaking Co.	25	00

ESTATE OF HORACE H. AUSTIN.

1921.			
Mar. 29.	To E. J. Avison	$ 124	65

ESTATE OF WILLIAM BARNIE.

1921.			
Mar. 21.	To County Treasury, taxes	$ 6	10
April 8.	Commission	7	54
April 25.	County Treasury, taxes	19	16
June 1.	Commission		08
Oct. 27.	E. J. Avison	115	00
	Charlotte Barnie	600	00
	Bessie Bruce	600	00
	Kate Inglis	600	00

ESTATE OF MAURICE BROWN.

1921.			
Mar. 2.	To E. J. Avison	$ 10	00

ESTATE OF JOHN BURI.

1921.			
Jan. 14.	To G. H. Greenwood	$ 2	50
Feb. 7.	Commission	3	10
Feb. 17.	E. J. Avison	10	20
June 17.	Commission		75

ESTATE OF A. E. BURDETTE.

1921.			
Feb. 7.	To Commission	$ 0	50
Feb. 25.	E. J. Avison	11	50

ESTATE OF ANDREW COBER.

1921.			
May 19.	To Commission	$ 2	49
June 24.	G. J. Duncan	50	00

ESTATE OF ANSTEN CHRISTIANSEN.

1921.			
Feb. 17.	To E. J. Avison	$ 71	30
Mar. 3.	Official Administrator, telegram	1	40
July 29.	Provincial Tax Collector, Smithers	36	40
Oct. 26.	Collector of Taxes	36	70

ESTATE OF T. CYR.

1921.			
June 23.	To Commission	$ 34	86
June 24.	Norwood Bros.	90	50
	Quesnel Hospital	42	00
	G. R. Baker	29	00
	Johnston Bros.	10	00
	J. A. Fraser & Co.	60	75
	Wah Lee & Co.	53	65
	S. N. Williams & Co.	272	40
	A. C. Wedding	64	88
	J. A. Fraser & Co., account Wedding	24	00
Aug. 6.	Commission	11	35
	Royal Bank, payment to Wedding	29	70
Sept. 28.	J. A. Fraser & Co.	20	25
	Wah Lee & Co.	17	85
Sept. 28.	S. N. William & Co.	90	80
	E. J. Avison	50	00
	Cariboo "Observer"	5	25
Oct. 25.	Collector of Taxes	16	16
Nov. 23.	Commission	3	90
	Caroline Cyr	74	95

ESTATE OF C. CHRISTIANSEN.

1921.			
Jan. 21.	To E. J. Avison	$ 50	98
Jan. 31.	„	15	87

CR.

ESTATE OF GUS ANDERSON.

1921.			
Feb. 7.	By Provincial Police, Ft. George	$ 42	73

ESTATE OF WILLIAM BARNIE.

1921.			
Mar. 23.	By Sale of War bonds	$ 150	70
May 14.	Interest on War bonds	1	60

ESTATE OF JOHN BURI.

1921.			
Jan. 14.	By B.C. Express Co.	$ 62	03
May 14.	Sale of effects	15	00

ESTATE OF A. E. BURDETTE.

1921.			
Jan. 14.	By Provincial Police, Ft. George	$ 10	00

ESTATE OF ANDREW COBER.

1921.			
April 5.	By Rent of property	$ 49	75

ESTATE OF ANSTEN CHRISTIANSEN.

1921.			
Dec. 15.	By Refund *re* taxes	$ 36	70

ESTATE OF T. CYR.

1921.			
June 23.	By Public Works Department, less advance by bank	$ 697	25
Aug. 6.	Mrs. Cyr	227	00
Nov. 23.	Cash, sale of cow	78	00

DR.

ESTATE OF G. ENANELLE.

1921.		
June 1.	To Commission	$ 0 11

ESTATE OF W. FERUS.

1921.		
April 8.	To Commission	$ 0 76
Aug. 6.	„	1 95

ESTATE OF W. GRELA.

1921.		
June 14.	To G. H. Greenwood	$ 2 00
June 17.	Commission	25

ESTATE OF HARRY HOLTMEYER.

1921.		
Jan. 21.	To E. W. Dunn, taxes	$ 25 82
Feb. 17.	E. J. Avison	5 00
Mar. 15.	E. W. Dunn, taxes	4 83
May 27.	F. Holtmeyer	60 00
	R. Shaner	60 00
	W. Holtmeyer	60 00
	A. Holtmeyer	60 00

ESTATE OF GEORGE HAMILTON.

1921.		
Mar. 15.	To E. J. Avison	$ 18 00
May 20.	S. Hamilton	31 04
	M. J. Hodgson	31 04
	E. Smith	31 03
	M. Rice	31 04
	A. Hamilton	31 03
	G. Hamilton	31 04
	H. S. Hamilton	31 04

ESTATE OF JOHN HEILMAN.

1921.		
Jan. 26.	To E. J. Avison	$ 43 50
Feb. 25.	„	45 83
June 22.	„	43 78

ESTATE OF PAUL HESSE.

1921.		
Mar. 3.	To E. J. Avison	$ 5 00

ESTATE OF H. P. HANSEN.

1921.		
Mar. 10.	To Commission	$ 14 40
April 8.	„	65
June 21.	Registrar, County Court	78

ESTATE OF GEORGE JENSEN.

1921.		
Mar. 15.	To E. J. Avison	$ 70 80

ESTATE OF H. S. JONES.

1921.		
Jan. 21.	To Collector of Taxes	$ 23 10
Feb. 11.	„	19 79
Feb. 17.	Interior Printing Co.	4 80
June 21.	E. J. Avison	41 39
July 6.	Commission	31 10
Sept. 28.	E. J. Avison	111 08
Oct. 26.	P. and K. Jonas, heirs	614 50

ESTATE OF WILLIAM JOHNSON.

1921.		
June 17.	To Commission	$ 0 10

ESTATE OF WALTER JOHNSON.

1921.		
June 1.	To Commission	$ 0 24

ESTATE OF WILLIAW KRUGER.

1921.		
Aug. 6.	To Commission	$ 2 21

ESTATE OF H. LOVEQUIST.

1921.		
Jan. 14.	To G. H. Greenwood	$ 2 50

ESTATE OF A. MCKINLEY.

1921.		
June 17.	To Commission	$ 0 09

ESTATE OF CHARLES MCCLINTOCK.

1921.		
Mar. 2.	To E. J. Avison	$ 7 19

CR.

ESTATE OF ERIC CHRISTIE.

1921.		
Oct. 29.	By Money found in cabin	$ 58 85

ESTATE OF G. ENANELLE.

1921.		
May 14.	By Sale of effects	$ 2 25

ESTATE OF W. FERUS.

1921.		
Mar. 11.	By Sale of effects	$ 15 15
July 27.	„	39 00

ESTATE OF W. GRELA.

1921.		
May 14.	By Sale of effects	$ 5 00

ESTATE OF H. P. HANSEN.

1921.		
Feb. 22.	By Refund from Government Agent, Quesnel	$ 288 00
Mar. 15.	E. J. Avison	12 94

ESTATE OF H. S. JONES.

1921.		
June 24.	By Bank account	$ 622 04

ESTATE OF WILLIAM JOHNSON.

1921.		
May 14.	By Sale of effects	$ 2 00

ESTATE OF WALTER JOHNSON.

1921.		
May 14.	By Sale of effects	$ 6 75

ESTATE OF WILLIAW KRUGER.

1921.		
Aug. 1.	By Cash, Provincial Police	$ 44 25

ESTATE OF A. MCKINLEY.

1921.		
May 14.	By Sale of effects	$ 1 75

DR.

ESTATE OF JAMES MCKITRICK.

1921.			
Feb. 17.	To E. J. Avison	$	5 00

ESTATE OF WILLIAM MCLENNAN.

1921.			
June 1.	To Commission	$	0 20

ESTATE OF ANGUS MCPHAIL.

1921.			
Feb. 17.	To E. J. Avison	$	10 50
April 8.	Government Agent		5 00
June 7.	Official Administrator		2 50
June 21.	E. J. Avison		7 50
Oct. 27.	Deputy Mining Recorder		112 50

ESTATE OF VINCENT MACHAC.

1921.			
July 6.	To Official Administrator	$	20 37

ESTATE OF S. G. MORGAN.

1921.			
May 19.	To Commission	$	4 28
June 1.	„		63 78
June 22.	E. J. Avison		59 35
July 20.	Registrar, Supreme Court		21 76

ESTATE OF LOUIS MURGIC.

1921.			
Jan. 14.	To Consul-General for the Kingdom, Serbs, etc.	$	17 25

ESTATE OF J. R. NORBOE.

1921.			
Mar. 10.	To Commission	$	0 32
July 6.	Official Administrator		2 75
Aug. 6.	Commission		8 51
Nov. 21.	Corless, Ltd.		125 00

ESTATE OF CHRIS OLSEN.

1921.			
Jan. 14.	To E. J. Avison	$	39 05
	Registrar, County Court		10 29
June 1.	Commission		94

ESTATE OF JOSEPH OLHMAN.

1921.			
Feb. 3.	To H. T. Kraemer	$	0 75
Mar. 2.	A. S. Vaughan		20 00
April 8.	Commission		1 49
July 9.	Collector of Taxes		10 75
	Commission		2 50
July 25.	Government Agent, Quesnel		133 33

ESTATE OF R. F. PRITCHARD.

1921.			
June 1.	To Commission	$	0 35

PERSONS UNKNOWN.

1921.			
June 1.	To Commission	$	1 02

ESTATE OF JOHN PERSON.

1921.			
May 3.	To Telegrams	$	4 60
	Edmonton "Bulletin"		6 00

ESTATE OF EDWIN PERKINS.

1921.			
Mar. 2.	To E. J. Avison	$	10 00
Mar. 10.	Commission		40
April 26.	Royal Cariboo Hospital, Barkerville		20 52

ESTATE OF S. J. SAMPSON.

1921.			
Aug. 6.	To Commission	$	7 86
Oct. 27.	E. J. Avison		11 60

ESTATE OF GABRIEL STIPICH.

1921.			
June 1.	To Commission	$	0 49
Oct. 11.	Probate duty		8 22

ESTATE OF A. SANDSTROM.

1921.			
June 17.	To Commission	$	0 25

CR.

ESTATE OF WILLIAM MCLENNAN.

1921.			
May 14.	By Sale of effects	$	4 00

ESTATE OF ANGUS MCPHAIL.

1921.			
June 28.	By Refund *re* power of attorney	$	2 50

ESTATE OF VINCENT MACHAC.

1921.			
June 20.	By Bank	$	407 45

ESTATE OF S. G. MORGAN.

1921.			
April 28.	By Cash, E. J. Avison	$	85 55
May 11.	„ bank		1,172 74
May 18.	„ Can. National Rly.		102 95

ESTATE OF J. R. NORBOE.

1921.			
Feb. 12.	By Cash, Provincial Police	$	6 40
June 22.	„ „		55 00
July 20.	„ bank		165 14
July 26.	„ Provincial Police		5 00

ESTATE OF CHRIS OLSEN.

1921.			
May 14.	By Sale of effects	$	18 75

ESTATE OF JOSEPH OLHMAN.

1921.			
Mar. 23.	By W. H. Dale, balance on sale of wheat	$	29 75
June 28.	E. J. Avison (loan account)		50 00
Sept. 21.	Collector of Taxes, refund		35

ESTATE OF R. F. PRITCHARD.

1921.			
May 14.	By Sale of effects	$	7 00

PERSONS UNKNOWN.

1921.			
May 14.	By Sale of effects	$	19 40

ESTATE OF JOHN PERSON.

1921.			
Dec. 15.	By Cash, sale of land	$	249 40

ESTATE OF JOHN PINKERTON.

1921.			
Nov. 11.	By C. Law	$	100 00
	Inspector of Municipalities		3 00

ESTATE OF EDWIN PERKINS.

1921.			
Mar. 10.	By Remittance to Treasury	$	8 00

ESTATE OF S. J. SAMPSON.

1921.			
July 26.	By Cash, Provincial Police	$	157 25

ESTATE OF GABRIEL STIPICH.

1921.			
May 14.	By Sale of effects	$	9 70

ESTATE OF A. SANDSTROM.

1921.			
May 14.	By Sale of effects	$	4 90

DR.

ESTATE OF CHARLES SCOTT.

1921.			
Jan. 14.	To G. W. Jebb, taxes	$	60 12
Feb. 17.	Edmonton "Journal"		33 00
Mar. 10.	Commission		2 50
Mar. 15.	Edmonton "Bulletin"		6 00
April 4.	Bank of Commerce (Lake Saskatoon)		2 00
May 19.	Commission		2 17
June 21.	L. W. Cottingham		8 50
	Edmonton "Journal"		7 50
	Official Administrator, telegrams		2 15
Aug. 6.	Commission		75
Nov. 11.	Geo. W. Jebb		74 45

ESTATE OF TONY STIPILCH.

1921.			
Oct. 27.	To E. J. Avison	$	37 50

ESTATE OF A. W. SAKEN.

1921.			
Dec. 30.	To E. J. Avison	$	7 00
	Dell Wilsey		360 20

ESTATE OF JOHN SPENCER.

1921.			
Jan. 25.	To E. J. Avison	$	38 20
Jan. 31.	Registrar, County Court		2 00
	F. M. Becker		328 81
Feb. 3.	E. J. Avison		11 18

ESTATE OF EUGENE SELLETT.

1921.			
Dec. 3.	To Commission	$	56 08
	F. Brassett		10 00
	Official Administrator for amounts paid as follows: George Warren, $75.25; J. McKinnon, $5; T. Arnoldus, $23		103 25
	W. E. Ekins, auctioneer		161 60
Dec. 20.	Registrar, County Court		17 54
Dec. 28.	Official Administrator, amount paid to George Warren, labour		35 00
Dec. 30.	A. Hold, looking after stock, etc.		50 00

ESTATE OF EUGENE SELLETT (PARTNERSHIP ACCOUNT).

1921.			
Dec. 31.	To Commission	$	41 10
	Mrs. Hold		110 00
	J. A. Fraser & Co.		49 50
	Official Administrator, advance *re* hay		37 63
	A. Hold, one-half of expenses		196 14
	W. H. Dale, one-half of a/c.		27 50

ESTATE OF GORDON THOMPSON.

1921.			
Aug. 3.	To R. D. Thompson	$	217 33

ESTATE OF WILLIAM TOWNSEND.

1921.			
Jan. 31.	To Cowan Supply Co.	$	9 25
	Yen War & Co.		8 25
	Allison Drug Co.		2 50
	Cariboo "Observer"		2 80
	J. A. Fraser & Co.		3 00
	Official Administrator		2 75
Feb. 7.	Commission		2 95
Mar. 9.	"		25
Mar. 16.	Royal Bank		48 75
May 19.	Commission		2 44
June 21.	E. J. Avison		45 55
	M. A. Welch		139 86
	T. Townsend		139 86
	J. Townsend		139 86
	M. Townsend		139 86
	J. E. Townsend		139 86

ESTATE OF B. TORNASI.

1921.			
June 17.	To Commission	$	0 10

CR.

ESTATE OF CHARLES SCOTT.

1921.			
Feb. 22.	By W. H. Watts, rent	$	50 00
April 18.	"		43 50
Aug. 6.	J. Archer		15 00

ESTATE OF EUGENE SELLETT.

1921.			
Nov. 1.	By Cheques, Creamery	$	67 45
Nov. 30.	Sale		1,054 25

ESTATE OF EUGENE SELLETT (PARTNERSHIP ACCOUNT).

1921.			
Dec. 30.	By Sale of hay	$	102 00
	"		720 00

ESTATE OF WILLIAM TOWNSEND.

1921.			
Jan. 12.	By C. D. Hoy	$	18 70
Jan. 28.	Provincial Government		40 00
Feb. 9.	Sale of effects		5 00
April 8.	Refund		48 75

ESTATE OF B. TORNASI.

1921.			
May 14.	By Sale of effects	$	2 00

DR.

ESTATE OF UGAN VIALE.

1921.			
Jan. 14.	To Dr. G. R. Baker	$	15 00
	G. H. Greenwood		2 50
June 17.	Commission		64 77
June 21.	Registrar, Supreme Court		14 21
June 21.	E. J. Avison		47 39
	I. Rubinowitz		26 00
July 24.	„		6 70
Aug. 10.	William Kask		25 00
Oct. 25.	Development Holdings, Ltd.		20 00

CR.

ESTATE OF UGAN VIALE.

1921.			
May 25.	By Canadian Bank of Commerce	$	1,295 49

EDGAR C. LUNN,
Official Administrator.

COLUMBIA ELECTORAL DISTRICT.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1921, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF ALEX. VACHON.

1921.			
Nov. 3.	To Administration fee	$	1 25
Dec. 31.	„		1 25

ESTATE OF WM. TROUTON.

1921.			
Oct. 31.	To Administration fee	$	57 50

ESTATE OF C. KITTILSON.

1921.			
May 31.	To Administration fee	$	0 68
Aug. 18.	„		2 75
	Taxes		20 00
Dec. 31.	Administration fee		3 44

ESTATE OF PAUL MATISCH.

1921.			
Aug. 17.	To Inspector of Municipalities	$	14 25

ESTATE OF WASYL STEFCHUK.

1921.			
May 31.	To Administration fee	$	1 38
Aug. 11.	Consul-General, Roumania		80 80
	Consul-General, Roumania (Victory bond)		1,000 00

ESTATE OF VICTOR NELSON.

1921.			
Mar. 1.	To Administration fee	$	15 18
	C. J. Sundgren		274 05
	J. E. Forslund		5 00
	Probate duty		1 33
	Law-stamps		2 10
	C. O. de Dardel		8 07

ESTATE OF ANTON FISHER.

1921.			
Aug. 7.	To Provincial Secretary	$	22 33

ESTATE OF AUGUST ANDERSON (GUST).

1921.			
Feb. 1.	To James Henderson	$	50 50
	Columbia River Lumber Co.		11 75
Aug. 18.	Administration fee		70 20
Nov. 17.	H. G. Lockwood		41 80
	Probate duty		18 41
	Golden "Star"		2 52

ESTATE OF W. MCGARRITY.

1921.			
April 5.	To Administration fee	$	3 96
	Provincial Secretary		43 00

ESTATE OF SAMUEL HIGH.

1921.			
Aug. 4.	To J. Adams	$	4 40
Aug. 16.	Taxes		4 97
Sept. 5.	Registrar, B. D. & M.		75
Oct. 3.	H. G. Lockwood		50 00
Nov. 30.	Administration fee		4 95
July 1.	Vancouver Hospital		34 08

CR.

ESTATE OF ALEX. VACHON.

1921.			
Oct. 31.	By Cash	$	25 00
Dec. 29.	„		25 00

ESTATE OF WM. TROUTON.

1921.			
May 2.	By Cash	$	1,150 00

ESTATE OF C. KITTILSON.

1921.			
May 2.	By Cash	$	13 75
June 2.	„		55 00
Nov. 3.	„		13 75
Dec. 1.	„		55 00

ESTATE OF WASYL STEFCHUK.

1921.			
May 2.	By Cash	$	27 50
June 6.	Victory bond		1,000 00

ESTATE OF VICTOR NELSON.

1921.			
Feb. 7.	By Cash	$	305 73

ESTATE OF AUGUST ANDERSON (GUST).

1921.			
Jan. 4.	By Cash	$	525 85
Jan. 22.	„		878 20
Nov. 15.	Dominion War bonds		500 00
	Dominion War bonds (interest coupons)		27 50

ESTATE OF W. MCGARRITY.

1921.			
Mar. 15.	By Cash	$	79 36

ESTATE OF SAMUEL HIGH.

1921.			
Aug. 1.	By Cash	$	15 00
Aug. 12.	„		74 15
Sept. 15.	„		10 00

DR.

ESTATE OF PATRICK MOORE.

1921.			
Sept. 15.	To G. E. Sanborn	$	3 50
Sept. 20.	H. Munson		52 50
Nov. 3.	Administration fee		10 67
Aug. 20.	Dr. Coy		60 00

CR.

ESTATE OF PATRICK MOORE.

1921.			
Aug. 15.	By Cash	$	43 95
Sept. 15.	„		169 45

G. E. SANBORN,
Official Administrator.

COMOX ELECTORAL DISTRICT.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1921, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF THOS. SMITH (OR SAVELARK).

1921.			
April 12.	To Slovak Republic Consul, Montreal	$	55 40

ESTATE OF DAN O'CONNEL.

1921.			
June 17.	To Government taxes	$	3 53

ESTATE OF GEO. HILLARY.

1921.			
June 17.	To Government taxes	$	7 20

ESTATE OF JUNG KUNG HIE (OR QUONG KEE).

1921.			
May 9.	To Charlie Sing Chong for wife of deceased	$	94 35

ESTATE OF EMIL HILVONEN.

1921.			
May 23.	To Emil Peterson for heirs of deceased	$1,269	90

ESTATE OF TONY FORTMAN (OR FREEMAN).

1921.			
Feb. 28.	To Official Administrator	$	27 50
Oct. 14.	„ „		11 35

ESTATE OF EMIL BRUNELL.

1921.			
Aug. 31.	To Belgian Consul for heirs of deceased	$	155 83

ESTATE OF CLEOPHAS TETU.

1921.			
Jan. 14.	To Arthur Tetu	$	340 74

ESTATE OF WM. PHILIPS.

1921.			
April 28.	To Matilda Dinsdale	$	146 75
June 17.	May Jane Davis		146 75
July 12.	Mrs. S. Watson		146 75
July 26.	Fanny Walker		146 75
	Henry Philips		146 75
Nov. 10.	John Philips		146 75
	Sarah Bennington		146 75

ESTATE OF ALEX. H. GRAHAM.

1921.			
Mar. 30.	To P. P. Harrison	$	20 00
	Comox "Argus"		7 20
	Official Administrator		8 75
April 4.	F. R. Biscoe		10 00
	Taxes, City of Courtenay		26 45
May 9.	Official Administrator		5 00
May 28.	F. R. Biscoe		5 00
	Taxes, City of Courtenay		7 38
June 2.	Official Administrator		2 50
June 17.	City of Courtenay, taxes, 1921		59 25
Aug. 15.	T. A. Graham		150 00

ESTATE OF JOHN MCKENZIE.

1921.			
Aug. 15.	To Alex. McKenzie	$	632 53

CR.

ESTATE OF TONY FORTMAN (OR FREEMAN).

1921.			
Jan. 20.	By Payment on land	$	550 00
	Taxes received		12 15
Oct. 7.	Payment on land		200 00
	Interest		27 00

ESTATE OF THOMAS HOLMES.

1921.			
Nov. 10.	By Dividend on stock	$	1 80

ESTATE OF ALEX. H. GRAHAM.

1921.			
Feb. 21.	By Cash, sale of lots	$	100 00
	„		75 00
April 4.	„		100 00
May 28.	„		50 00

DR.

ESTATE OF COLIN C. BUCHANAN.

1921.			
May 31.	To Comox "Argus"	$	4 60
June 2.	Mother of deceased		113 11

ESTATE OF THOS. J. STAINER.

1921.			
Oct. 14.	To Official Administrator	$	1 75

ESTATE OF RICHARD HOLM.

1921.			
July 12.	To Government taxes	$	1 00

ESTATE OF NORMAN HULBERT.

1921.			
April 26.	To Mrs. A. McCardell	$	17 00

ESTATE OF DUNCAN MCEWEN.

1921.			
Jan. 3.	To Official Administrator	$	18 00
	Willows Hotel		45 50

ESTATE OF ALEX. WIBER.

1921.			
Jan. 31.	To P. P. Harrison	$	20 00
July 6.	Islander Printing Co.		5 00
July 31.	Official Administrator		26 50
	Cumberland General Hospital		45 00
	Dr. MacNaughton		42 00
July 6.	Esthonian Consulate		176 40

ESTATE OF LING SING.

1921.			
Jan. 17.	To funeral expenses	$	12 00
Mar. 30.	To Official Administrator		5 50
	Charlie Sing Chong		87 95

ESTATE OF MAH SUN FOO.

1921.			
Mar. 30.	To Official Administrator	$	1 15
	Charlie Sing Chong		21 70

ESTATE OF MAH DON.

1921.			
May 9.	To Official Administrator	$	1 40
	To Charlie Sing Chong		27 48

ESTATE OF THOS. JORGESON.

1921.			
May 6.	To Funeral expenses	$	50 00
May 9.	Official Administrator		3 35

ESTATE OF NEILS LELAND.

1921.			
April 25.	To Court costs	$	5 30
April 21.	Probate duty		20 65
May 31.	Funeral expenses		15 00
June 2.	P. P. Harrison		25 00
	Islander Printing Co.		5 00
	Official Administrator		20 87
	Nimpkish Lumber Co.		77 38
June 14.	W. E. Fowler		28 25
	Mrs. B. Fowler		31 80
June 2.	Geo. Carrie		25 00
	Julian Olney		25 00

ESTATE OF MARGRETT P. WILLIS.

1921.			
May 16.	To Court costs	$	4 40
	Government taxes		6 70
June 1.	J. M. Mitchell		10 75
	Official Administrator		10 00

ESTATE OF MICHAEL PEMBROKE.

1921.			
May 12.	To J. Sutton	$	45 00
May 26.	Telephone calls and postage		75
June 2.	Official Administrator		2 72

DR.

ESTATE OF JOHN A. CROUSE.

1921.			
May 13.	To Death certificate	$	0 85
June 14.	Notary fees		1 00
June 29.	Letters of Administration		1 00
Aug. 20.	Bank exchange and postage		1 00
	Solicitor's fees		59 50
	Official Administrator		19 87
	Advertising letters of administration		6 72
Oct. 19.	W. Crouse		10 69

CR.

ESTATE OF THOS. J. STAINER.

1921.			
Aug. 6.	By Sale of personal effects	$	35 00

ESTATE OF LING SING.

1921.			
Feb. 2.	By wages	$	105 45

ESTATE OF MAH SUN FOO.

1921.			
Feb. 2.	By wages	$	22 93

ESTATE OF MAH DON.

1921.			
April 26.	By wages	$	28 88

ESTATE OF THOS. JORGESON.

1921.			
April 1.	By wages	$	67 20

ESTATE OF NEILS LELAND.

1921.			
Mar. 2.	By Cash on deceased	$	10 00
May 5.	Cash from bank		403 09
	Bank interest		4 41
Oct. 18.	Wages		12 57

ESTATE OF MARGRETT P. WILLIS.

1921.			
May 28.	By Cash	$	200 00

ESTATE OF MICHAEL PEMBROKE.

1921.			
May 4.	By Wages	$	39 40
	Money-order		15 00

CR.

ESTATE OF JOHN A. CROUSE.

1921.			
June 14.	By Money-order	$	5 25
	Time-cheque		74 00
July 14.	Cash in bank		21 38

DR.

ESTATE OF THOS. BRIGGS.

1921.			
Oct. 6.	To Court costs	$	2 20
	Three copies of letters of administration		3 00
	Probate duty		5 53
Oct. 13.	John Sutton		145 00
Oct. 14.	P. P. Harrison		20 00
	Official Administrator		28 91
	Islander Printing Co.		5 40

ESTATE OF SAM MOLUK.

1921.			
Aug. 20.	To Official Administrator	$	3 50

ESTATE OF NEIL WILLIS.

1921.			
Oct. 14.	To John Sutton	$	133 50
	Sidney Marshall		30 00
	R. L. Hand		25 00
	Official Administrator		11 25

ESTATE OF C. C. SMITH.

1921.			
Dec. 2.	To Official Administrator	$	0 75

ESTATE OF JOHN CLEARY.

1921.			
Dec. 2.	To Official Administrator	$	1 25

ESTATE OF JAS. SIMPSON.

1922.			
Jan. 5.	To Bank exchange and postage	$	0 53
	Official Administrator		3 00

ESTATE OF HARRY MCCLUSKEY.

1921.			
Jan. 15.	To Official Administrator	$	8 95
Jan. 17.	Gwilt Lumber Co.		63 66
	Courtenay Hardware		7 35
	J. H. Hawkins		30 00
	Geo. Hawkins		10 00
	J. C. Atkinson		25 60
June 17.	Government taxes		9 15
Dec. 2.	Official Administrator		2 50

ESTATE OF JOE SAUBERAN.

1921.			
Oct. 14.	To John Sutton	$	32 00

CR.

ESTATE OF THOS. BRIGGS.

1921.			
June 18.	By Cash on deceased	$	4 50
June 20.	Wages		23 85
Oct. 12.	Cash in bank		289 96
	Victory bonds		198 00
	Interest		22 00

ESTATE OF SAM MOLUK.

1921.			
June 22.	By Cash on deceased	$	4 20
	Wages		65 47

ESTATE OF NEIL WILLIS.

1921.			
Aug. 18.	By Cash on deceased	$	60 00
Sept. 10.	Bank-cheque		150 00

ESTATE OF C. C. SMITH.

1921.			
Nov. 9.	By Wages	$	11 07

ESTATE OF JOHN CLEARY.

1921.			
Oct. 25.	By Cash on deceased	$	2 70
	Wages		15 50

ESTATE OF JAS. SIMPSON.

1921.			
Dec. 27.	By Wages	$	60 53

ESTATE OF HARRY MCCLUSKEY.

1921.			
Jan. 15.	By Sale of water-pipe	$	15 00
	Rent		164 00
Dec. 2.	,,		50 00

ESTATE OF JOE SAUBERAN.

1921.			
Aug. 10.	By Cash on deceased	$	5 00
Sept. 7.	Wages		29 67

WESLEY WILLARD,
Official Administrator.

CRANBROOK ELECTORAL DISTRICT.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1921, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF OLE BENSON.

1921.			
July 11.	To John Manning	$	17 10
Aug. 22.	Commission, O.A.		2 42
	John Manning		28 98

ESTATE OF ARTHUR COWAN.

1921.			
Sept. 13.	To Commission, O.A.	$	5 03
	Legal fees, Nesbit & Graham		10 00
Oct. 23.	F. M. Macpherson, funeral expenses		85 67

ESTATE OF GUST. FRIBERG.

1921.			
Oct. 23.	To Express on trunk	$	2 00
	F. M. Macpherson, funeral expenses		196 00
Nov. 2.	Commission, O.A.		18 04

ESTATE OF CHAR GAR.

1921.			
Oct.	To Chin Toy, funeral expenses	$	6 00

CR.

ESTATE OF OLE BENSON.

1921.			
June	By Sale of shotgun	$	10 00
	,, Winchester gun		12 00
	,, six boxes of shells		8 00
July 19.	Chas. Collins, account due		18 50

ESTATE OF ARTHUR COWAN.

1921.			
Aug. 1.	By Cash	$	100 00
Sept. 13.	Bank interest		70 00

ESTATE OF GUST. FRIBERG.

1921.			
Oct. 7.	By Cheque	$	217 06
Nov. 1.	,,		136 85
	,,		7 00

ESTATE OF CHAR GAR.

1921.			
Oct. 15.	By Cash	$	6 00

DR.

ESTATE OF JAMES HOWARD.

1921.			
April 23.	To Care of horses	$	3 00
April 25.	Robt. Cassels		78 33
	McCreery Bros.		13 20
April 30.	John Manning		15 63
May 10.	Commission, O.A.		15 44
	Expense, selling team		7 20
May 18.	J. W. Rutledge, V.S.		8 00
May 20.	J. A. Macdonald		17 00
June 1.	F. M. Macpherson, funeral expenses		151 00

ESTATE OF THOMAS HOWLAND.

1921.			
July 11.	To F. M. Macpherson, funeral expenses	$	193 00
	Commission, O.A.		21 52
	St. Eugene Hospital		149 21
	Probate duty		21 61
July 25.	Cranbrook "Courier"		5 16
Sept. 2.	Macdonald, Nesbit & Graham		40 00

ESTATE OF MABEL ELIZA JOHNSON.

1921.			
Sept. 2.	To Cranbrook "Courier"	$	5 04
Sept. 13.	Commission, O.A.		53 20
Oct. 15.	St. Eugene Hospital		78 50
	F. M. Macpherson, funeral expenses		225 00
	Registrar, County Court		3 33

ESTATE OF HENRY JOHNSON.

1921.			
June 17.	To Commission, O.A.	$	0 87
	J. H. Johnson		16 58

ESTATE OF PATRICK KILKELLY.

1921.			
Sept. 2.	To Macdonald, Nesbit & Graham	$	10 00
	Jas. Beech		10 00
Sept. 13.	Commission		8 33
Sept. 17.	F. M. Macpherson, funeral expenses		108 00

1921. ESTATE OF JOHN MCTAVISH.
Sept. 2. Waiting sale of real estate.

ESTATE OF JOHN SEWARD MCGILLIVAY.

1921.			
Nov. 2.	To Commission and expressage	$	2 86

1921. ESTATE OF JOHN SJOBERG.

May 23.	To F. M. Macpherson, funeral expenses	$	172 50
	Cranbrook Bakery		8 55
July 11.	Probate duty		4 46
July 25.	Cranbrook "Courier"		5 16
Aug. 22.	Commission, O.A.		22 54
Sept. 2.	Macdonald, Nesbit & Graham		40 00
Oct. 8.	Swedish Consul		197 91

1921. ESTATE OF JOHN J. CAMERON.
This estate is mostly poles cut and no market and still in bush.

CR.

ESTATE OF JAMES HOWARD.

1921.			
May 10.	By Sale of team	$	275 00
	Wages		33 80

ESTATE OF THOMAS HOWLAND.

1921.			
May 23.	By Cash	$	430 50

ESTATE OF MABEL ELIZA JOHNSON.

1921.			
June 20.	By Cash in bank	$1,056	16
Sept.	Interest		7 92

ESTATE OF HENRY JOHNSON.

1921.			
April 20.	By Cash	$	17 45

ESTATE OF PATRICK KILKELLY.

1921.			
Aug. 18.	By Cash and cheques	$	166 72

ESTATE OF JOHN SEWARD MCGILLIVAY.

1921.			
Nov. 2.	By Wages	$	17 26

1921. ESTATE OF JOHN SJOBERG.

May 3.	By Bank of Commerce	$	129 81
	Imperial Bank		256 55
July 12.	Interest		1 90
	Wages		62 65

JOHN LEASK,
Official Administrator.

FERNIE ELECTORAL DISTRICT.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1921, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF GUST. AXNER.

1921.			
July 22.	To A. Rosen	$	16 68

ESTATE OF WILLIAM EDWIN ASHLEY.

1921.			
Feb. 5.	To Miss Georgina Ashley	$1,822	60

ESTATE OF SILVIO BAGLIO.

1921.			
Aug. 1.	To D. M. Mitchell	$	21 30
Sept. 28.	Royal Consul-General for Italy, Montreal		793 79

CR.

DR.

ESTATE OF G. BOSETTI.

1921.			
July 8.	To S. Herchmer	$	32 40
	Commission		13 48
July 12.	Frank Santoni		263 50
Aug. 8.	Commission		35

ESTATE OF SEVERINE BROWN.

1921.			
Feb. 22.	To Mrs. Theadere Brown, guardian of—		
	Bertha Brown	$	61 44
	Margaret Brown		61 44
	Thelma Brown		61 44

ESTATE OF GIACOMO CANZIONO.

1921.			
Jan. 5.	To E. Bigattini	$	13 50
	Consul-General, Montreal		1,563 54

ESTATE OF ANDREW CZHEREZ.

1921.			
Oct. 5.	J. F. Armstrong, O.A.	$	1 85

ESTATE OF PIETRO COLUSSI.

1921.			
Aug. 8.	To Commission	$	9 32
Oct. 21.	Registrar, County Court		2 00
Oct. 14.	Fernie "Free Press"		5 00
Oct. 28.	Santo Bianchet		39 50
	Nick Gardin		33 75
Nov. 10.	Lawe & Fisher		31 75
Nov. 15.	Consul-General for Italy, Montreal		65 08

ESTATE OF FRANK DIGIUSTI.

1921.			
Aug. 8.	To Commission	$	2 43
Nov. 10.	Alex. Lozza		42 64
	Joe Aiello		3 53

ESTATE OF WILLIAM DUNN.

1921.			
Mar. 26.	To Grimmett & Parker	$	25 00
Aug. 8.	Commission		1 96
Nov. 11.	Official Administrator		8 05
	Grimmett & Parker		17 35

ESTATE OF MARIE FALIP.

1921.			
June 28.	To City of Fernie	$	37 00
Aug. 8.	Mrs. Erma Falip		12 00
	Commission		4 86
Dec. 12.	G. G. Moffatt		8 50
Dec. 23.	Mrs. Erma Falip		12 00

ESTATE OF KENNETH R. FOSTER.

1921.			
April 4.	To D. M. Mitchell	$	32 55
April 15.	Mrs. Peter Gordon		78 75
	Commission		82 72
	District Registrar		6 00
April 29.	J. T. Jones		73 15
	Freight on effects to Fernie		7 54
July 8.	J. T. Jones		8 55
July 12.	Commission		26 26
	Mrs. Peter Gordon		54 50
Aug. 8.	Commission		2 50
Sept. 28.	G. G. Moffatt		50 00
	Mrs. Peter Gordon		77 50
	H. J. Jarrett		2 45
	Crow's Nest Southern Rly.		10 80
Oct. 3.	Thos. McGladrey		12 00
Nov. 18.	G. G. Moffatt		6 00
	Mrs. Anderson		239 20
Dec. 19.	Deputy Minister of Finance		21 22

CR.

ESTATE OF G. BOSETTI.

1921.			
Jan. 17.	By W. Oakley	$	7 00
Feb. 15.	"		7 00
Mar. 7.	"		7 00
June 14.	S. Herchmer		248 72

ESTATE OF PIETRO COLUSSI.

1921.			
April 21.	By Cash	$	136 40
May 5.	Fernie Workingmen's Co-operative		50 00

ESTATE OF FRANK DIGIUSTI.

1921.			
April 14.	By Crow's Nest Pass Coal Co., Ltd.	$	48 60

ESTATE OF WILLIAM DUNN.

1921.			
Nov. 10.	By Grimmett & Parker	$	161 20
April 4.	E. W. Veale, per Grimmett & Parker		39 20

ESTATE OF MARIE FALIP.

1921.			
Feb. 14.	By R. Anselmo	$	7 20
Mar. 12.	"		10 00
April 11.	"		10 00
May 7.	"		10 00
June 6.	"		10 00
July 5.	"		10 00
Aug. 1.	"		10 00
Nov. 10.	"		30 00

ESTATE OF KENNETH R. FOSTER.

1921.			
Mar. 1.	By Department of Agriculture	$	199 50
Mar. 7.	" "		390 06
Mar. 9.	Sale of effects		388 70
Mar. 10.	"		10 00
Mar. 11.	"		30 00
Mar. 15.	"		312 50
Mar. 17.	Refund from "Everyday Engineering Magazine"		2 00
Mar. 22.	Cash found among papers		50
	Home Bank of Canada		271 35
	Canadian Bank of Commerce		31 81
Mar. 26.	Farmers' & Merchants' State Bank, Eureka		16 02
	Exchange, Farmers' & Merchants' State Bank, Eureka		2 02
April 25.	Department of Agriculture		380 00
April 28.	Dr. Robt. Clegg		50 00
May 12.	R.C.M.P.		25 00
June 10.	E. Lynn, sale of effects		26 35
June 18.	R.C.M.P.		25 00
June 24.	G. G. Barber, sale of effects		19 00
July 12.	R.C.M.P.		25 00
Sept. 21.	"		50 00
Oct. 11.	Thomas McGladrey, sale of effects		60 50
Oct. 17.	R.C.M.P.		25 00
Nov. 16.	F. Frady, sale of effects		7 00
Dec. 1.	R.C.M.P.		25 00
Dec. 17.	"		25 00

DR.

ESTATE OF JULES GABRIAN.

1921.			
Aug. 8.	To Commission	$	2 30
Nov. 25.	D. M. Mitchell		23 80

ESTATE OF P. V. JAMES.

1921.			
Jan. 17.	To City of Fernie	$	3 15
Feb. 18.	,,		3 15
Feb. 24.	Commission		8 75
Mar. 2.	The Duthie Co.		12 60
Mar. 10.	City of Fernie		3 15
June 21.	G. G. Moffatt		81 00
June 21.	City of Fernie		13 65
June 28.	,,		82 00
Aug. 8.	Commission		8 75
Sept. 28.	City of Fernie		10 15
Nov. 18.	,,		9 45

ESTATE OF DAVID L. KELLY.

1921.			
Jan. 17.	To Commission	$	75 90
Aug. 8.	,,		3 00
Aug. 8.	Telephones to Elko and Cranbrook		75
Sept. 27.	Provincial Collector, Cranbrook		1,500 00
Oct. 24.	Herchmer & Mitchell		150 00
Dec. 10.	Mrs. Bernice Roberts		250 00
Dec. 20.	A. B. Macdonald		100 00

ESTATE OF E. KREGER.

1921.			
Aug. 8.	To Commission	$	3 31
	C.P.R., freight and storage		14 67
Sept. 2.	Thos. McGladrey		2 00

ESTATE OF JOHAN KUZENKO.

1921.			
Aug. 8.	To Commission	$	4 75
July 24.	Fernie Hospital		90 00
Oct. 7.	Registrar, County Court		3 95
July 26.	Fernie Undertaking Co.		150 00
July 30.	Drs. Bonnell, Garner & Asselstine		70 00
Oct. 10.	Herchmer & Mitchell		29 80
Oct. 14.	Fernie "Free Press"		5 00

ESTATE OF CARL MELIN.

1921.			
Dec. 12.	To Royal Swedish Consul-General	$	168 38

ESTATE OF DAVE MUIR.

1921.			
Aug. 8.	To Commission	$	7 55

ESTATE OF JOSEPH O'REILLY.

1921.			
Sept. 28.	To Thomas O'Reilly	$	24 72
	James O'Reilly		24 72
	Mary O'Reilly		24 73
	Mrs. McEnroe		24 72

ESTATE OF MARK POSKITT.

1921.			
April 4.	To Royal Trust Co., Winnipeg	$	104 24

ESTATE OF WILLIAM PEREDOCK.

1921.			
Feb. 24.	To Commission	$	20 69
Mar. 5.	Probate duty		4 07
	Law-stamps		3 10
Mar. 7.	D. M. Mitchell		31 95

ESTATE OF PETE PASCUTTO (OR PASQUTTO).

1921.			
Jan. 7.	To Royal Consul-General for Italy	$	104 10

ESTATE OF JOSEPH PUSLEY.

1921.			
Aug. 8.	To Commission	$	50
Dec. 12.	D. M. Mitchell		29 80
Aug. 8.	Fire-insurance premium		3 00

CR.

ESTATE OF JULES GABRIAN.

1921.			
April 8.	By Simeon Weaver	$	6 00
May 6.	,,		6 00
June 4.	,,		6 00
Sept. 21.	,,		18 00
Oct. 11.	,,		6 00
Nov. 10.	,,		6 00
Dec. 7.	,,		6 00

ESTATE OF P. V. JAMES.

1921.			
Jan. 18.	By P. Rawson	$	25 00
Feb. 16.	,,		25 00
Mar. 18.	,,		25 00
April 19.	,,		25 00
May 16.	,,		25 00
June 16.	,,		25 00
July 15.	,,		25 00
Sept. 21.	,,		25 00
	,,		25 00
Oct. 14.	,,		25 00
Nov. 22.	,,		25 00
Dec. 20.	,,		25 00

ESTATE OF DAVID L. KELLY.

1921.			
April 15.	By Adolph Lumber Co.	$	60 00

ESTATE OF E. KREGER.

1921.			
June 3.	By Rock Creek Lumber Co.	$	14 78
	Cash on body		51 50

ESTATE OF JOHAN KUZENKO.

1921.			
July 25.	By Cash, Fernie Hospital	$	95 00
Oct. 8.	Savings account, Canadian Bank of Commerce		414 47

ESTATE OF GUERRINO PERRIN.

1921.			
Dec. 17.	By Crow's Nest Pass Coal Co., Ltd.	$	32 15

ESTATE OF JOSEPH PUSLEY.

1921.			
July 2.	By Edw. Brett	$	10 00
Nov. 24.	,,		20 00
Dec. 5.	,,		5 00

DR.

ESTATE OF JAMES RIVERO.

1921.			
Aug. 8.	To Express on trunk from Corbin, B.C.	$	2 15

ESTATE OF MICHAEL ROESER.

1921.			
Jan. 6.	To District Registrar, Supreme Court	$	200 00
Mar. 26.	Taxes, 1919, 1920, and 1921		19 60

ESTATE OF ERICH SCHNEIDER.

1921.			
Aug. 8.	To Commission	$	0 75

ESTATE OF PAUL SHINGARA.

1921.			
Aug. 6.	To Commission	$	0 70

ESTATE OF JOHN YASKI.

1921.			
Oct. 28.	To Fernie "Free Press"	$	5 00
Aug. 23.	Fernie Undertaking Co.		173 00
Nov. 10.	Lawe & Fisher		40 90
Oct. 11.	Registrar, County Court		2 00

ESTATE OF JOHN HUNTER.

1921.			
Feb. 7.	To Commission	$	13 09
	Mrs. E. Hunter		23 61
	Mrs. M. Clayham		197 20

CR.

ESTATE OF JOHN YASKI.

1921.			
Oct. 14.	By P. Rawson, sale of effects	$	8 00
	Cash on body		80
Oct. 26.	P.O. Savings Bank account, Ottawa		1,049 40

R. J. STENSON,
Official Administrator.

FORT GEORGE ELECTORAL DISTRICT.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1921, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF MILTON BOLTEN.

1921.			
Dec. 31.	To J. D. Moore	$	0 75
	"		24 00

ESTATE OF J. J. REGALADO.

1921.			
Nov. 30.	To J. D. Moore	$	2 84

ESTATE OF ALONZA MALUOIN.

1921.			
Oct. 31.	To J. D. Moore	$	125 41
	Probate fee		5 08

ESTATE OF W. R. GRAHAM.

1921.			
Aug. 1.	To Registering lien	$	0 25
	Dominion Telegraph		8 00
	Probate fees		32 79
	L. W. Cottingham		175 00
Sept. 25.	J. D. Moore		34 67
Sept. 30.	"		28 55
	"		5 78
	"		4 00
Sept. 31.	"		27 00

ESTATE OF EDMUND BROWN.

1921.			
Nov. 30.	To J. D. Moore	$	3 75
Dec. 1.	Gunder Wrolson		56 00

CR.

ESTATE OF MILTON BOLTEN.

1921.			
Nov. 21.	By L. W. Cottingham, camera	$	10 00
	" watch, etc.		9 20
	W. McWha, raffle		5 00
Dec. 31.	J. Belcourt		35 00

ESTATE OF J. J. REGALADO.

1921.			
Aug. 10.	By Transferred from Quesnel	$	146 76
Sept. 13.	Canadian Bank of Commerce, sale of bond		56 91

ESTATE OF ALONZA MALUOIN.

1921.			
Oct. 31.	By Canadian Bank of Commerce	$	136 32

ESTATE OF W. R. GRAHAM.

1921.			
April 4.	By I. E. Haight, stock	$	238 00
Aug. 1.	G. E. Freer, stock		455 44
Nov. 23.	T. Ede		27 00
	H. Taylor		75 00
	"		12 00
	"		1 65
	G. R. Freer		80 00

ESTATE OF EDMUND BROWN.

1921.			
Nov. 30.	By Oscar Sundlie, horses	$	75 00

J. D. MOORE,
Official Administrator.

GRAND FORKS ELECTORAL DISTRICT.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1921, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF JOHN ALFRED GOULD.

1921.			
May 18.	To H. L. Mackenzie, solicitor's bill	$ 26	55
	Mrs. E. A. Cooper, funeral expenses	100	00
	Grand Forks "Gazette"	2	88
	A. Schnitter, telegram to relatives	1	26
	Administrator's commission and expenses	29	45
June 3.	H. L. Mackenzie	25	00
	Dr. C. M. Kingston, hospital and medical attendance	403	83

ESTATE OF JOHN MAY.

1921.			
Feb. 28.	To H. L. Mackenzie, solicitor's bill	$ 18	45
	Grand Forks "Gazette"	2	76
	Administrator's commission and expenses	7	70
	Miller & Gardner, balance of funeral expenses	87	50
Mar. 21.	John A. Peterson, on account of funeral expenses	12	26

ESTATE OF RONALD GEORGE BILLINGSLEY.

1921.			
June 3.	To Grand Forks "Gazette"	$ 2	88
	J. H. Ryley, solicitor's bill	18	40
Oct. 27.	Miller & Gardner, balance of funeral expenses	51	00
	Jas. H. Ryley, solicitor's bill	10	00
	Administrator's commission and expenses	16	37
Nov. 11.	Woodland & Co.	4	46
	Dr. W. Truax	13	77
	Miss N. Carter	2	04
	Dr. C. M. Kingston	15	97
	T. H. Paulson	23	03
	H. D. Griswold	133	09

ESTATE OF JOHN HOLM.

1921.			
May 8.	To Corporation of Grand Forks, taxes	$ 48	50

ESTATE OF THOMAS FOX.

1921.			
Feb. 14.	To Mrs. Hannah Fox, share of estate passing to heirs	$2,430	97
	Hy. O. Alexander, Official Guardian, shares passing to minor children	328	52

ESTATE OF MICHAEL REILLY.

1921.			
Feb. 15.	To John Reilly and Jane Reilly, balance of estate	$ 12	39

ESTATE OF BIAGIO LI CLAUDIO.

1921.			
Feb. 22.	To H. L. Mackenzie, solicitor's bill	$ 37	45
	Royal Consul-General for Italy, Montreal, balance due heirs	975	71

ESTATE OF JOHN JUZWOW.

1921.			
Jan. 4.	To Administrator's commission and expenses	$ 11	55

ESTATE OF CHARLES PELLETIER.

1921.			
Mar. 23.	To Rev. Father Coccola, refund of accounts paid	$ 325	00

CR.

ESTATE OF JOHN ALFRED GOULD.

1921.			
Feb. 8.	By Cash on person, per Chief of Police	$ 582	45
	Premium on U.S. money		12
	Cash, Chief of Police	6	40

ESTATE OF JOHN MAY.

1921.			
Feb. 23.	By Cheques, Great Northern Rly. Co., wages	$ 30	35
	Premium on U.S. cheques	2	55

ESTATE OF RONALD GEORGE BILLINGSLEY.

1921.			
Jan. 5.	By Cash, R. D. McCabe, balance due on interest in auto	$ 42	75

ESTATE OF FRED SENIUK.

1921.			
Aug. 30.	By Cash, sale of watch	$ 15	00

NEIL McCALLUM,
Official Administrator.

GREENWOOD ELECTORAL DISTRICT.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1921, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF G. A. SOUTHERN.

1921.			
Oct. 13.	To Nelson "News"	$	2 35
Nov. 2.	Robert Mitchell		11 85
Nov. 23.	R. Forshaw, grazing team		7 50

ESTATE OF ROBERT GILLIAN.

1921.			
Mar. 10.	To Clara Eliza Jane Currie	$	25 78
	George Gillian		25 78

CR.

ESTATE OF G. A. SOUTHERN.

1921.			
Nov. 27.	By Sale of team	$	250 00

CHARLES KING,
Official Administrator.

KAMLOOPS ELECTORAL DISTRICT.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1921, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF ROBERT BUNT.

1921.			
Jan. 14.	To Exchange	$	1 50
	C. Kamloops		164 68
	Frontier Co.		312 50
	Blackbourne		124 50
Jan. 17.	Exchange		10
Mar. 22.	"		1 50
	Official Administrator		403 89
Aug. 1.	Exchange		12
Nov. 16.	J. R. Archibald		143 05
	Fulton & Co.		287 40
Dec. 1.	Exchange		15
	Official Administrator		14 18
	A. Irvine		360 00
	J. Bunt		360 00
	T. T. Bunt		360 00
Dec. 12.	Executors of C. Polson Est.		360 00

ESTATE OF ELSEOR BESSETTE.

1921.			
Aug. 9.	To Official Administrator	$	1 62
	Mrs. E. Bessette		9 20

ESTATE OF FRANK BERRY.

1921.			
Aug. 22.	To Auctioneer's fee	$	0 65
Sept. 2.	Exchange		02

ESTATE OF WALTER H. CLEMENTS.

1921.			
Jan. 4.	To M. A. Clements	$	11 46
	Official Administrator		75
Dec. 8.	Filing copy, letters of administration		1 00
Dec. 22.	Exchange on cheque		40
1922.			
Jan. 3.	Exchange		25

ESTATE OF ELI CASTONGUAY.

1921.			
Aug. 22.	To Auctioneer's fee	$	0 70
Sept. 2.	Exchange		02

ESTATE OF PETER CHERNIAK.

1921.			
June 23.	To Minister of Finance	$	20 00
June 27.	Official Administrator		2 00
	Royal Inland Hospital		3 60

ESTATE OF GEORGE A. DUNCAN.

1921.			
Aug. 22.	To Auctioneer's fee	$	0 75
Sept. 2.	Exchange		02
Oct. 25.	Official Administrator		73
	Minister of Finance		6 00

CR.

ESTATE OF ROBERT BUNT.

1921.			
Jan. 14.	By Purchase price	$	1,500 00
Jan. 17.	Refund, insurance premium		4 68
Feb. 16.	Purchase price		1,500 00
July 22.	Mortgage interest		30 00
Nov. 14.	"		130 00

ESTATE OF FRANK BERRY.

1921.			
Aug. 22.	By Sale of watch	$	6 50

ESTATE OF WALTER H. CLEMENTS.

1921.			
Dec. 22.	By Liquidator, Canadian Home Investment Co., dividends	$	86 26

ESTATE OF ELI CASTONGUAY.

1921.			
Aug. 22.	By Sale of watch	$	4 00
	Sale of alarm clock		3 00

ESTATE OF GEORGE A. DUNCAN.

1921.			
Aug. 22.	By Sale of watch	$	7 50

DR.

ESTATE OF JOHN TREVOR DAVIES.

1921.			
Jan. 6.	To J. R. Archibald	$	18 80
	District Registrar		26
	Official Administrator		12 44
Feb. 4.	Egan & Johnson		10 00
	J. L. Gordon		200 50
	Drs. Burris, Archibald & Burris		10 00
	Royal Inland Hospital		2 00

ESTATE OF WILFRED B. DAVENPORT.

1921.			
Feb. 7.	To Official Administrator	$	18 25
	J. R. Archibald		20 75
Feb. 17.	Mrs. R. H. Lewis		33 14
April 18.	Telegram Pub. Co., Ltd.		9 00

ESTATE OF JOSEPHINE EGRESITZ.

1921.			
Aug. 22.	To Auctioneer's fee	$	0 70
Sept. 2.	Exchange		02

ESTATE OF JOHN FRANK.

1921.			
June 23.	To Filing letters of administration	$	0 50
July 5.	Exchange		12
Aug. 1.	"		13
	Official Administrator		12 90
	J. L. Gordon		100 00
	Father LeJeune		5 00
	Telegram Co.		9 00
	District Registrar		2 50

ESTATE OF ALEXANDER FOSTER.

1921.			
Feb. 7.	To W. R. Sexsmith, fees	$	8 00
	Exchange		25
Mar. 2.	"		05
May 25.	City of Kamloops		8 60
Aug. 11.	Corporation of Burnaby		3 99

ESTATE OF D. FRASCATORE.

1921.			
Jan. 21.	To A. E. Sage	$	80 85

ESTATE OF GEORGE W. FLINT.

1921.			
May 2.	To Exchange	$	0 25
	Official Administrator		8 41
	R. Flint		264 00

ESTATE OF P. GRECO.

1921.			
May 2.	To Official Administrator	$	5 63
	Italian Consul		260 45

ESTATE OF JOHN W. HAWTHORNE.

1921.			
Jan. 26.	To Official Administrator	$	0 80
	Lucy M. Little		36 00
	C. W. Hawthorne		36 00

ESTATE OF JAMES HILL.

1921.			
Aug. 22.	To Auctioneer's fee	$	0 15

ESTATE OF MARGARET E. HARRIS.

1921.			
Jan. 14.	To Kamloops Press, Ltd.	$	9 00
Mar. 1.	Minister of Finance		105 17

ESTATE OF JOHN HAMMER.

1921.			
Jan. 6.	To J. R. Archibald	$	29 85
	District Registrar		1 53
Feb. 17.	Kamloops Press, Ltd.		9 00
June 7.	Fee for copy, letters of administration		1 00
	Fee for filing in Land Registry		50
	Fee for filing S.S. Board release		1 00
Sept. 8.	Potter's account, paid by deduction		70 00
	Collector of taxes		14 40
Oct. 4.	Exchange		25
	Telegram Co.		5 32
	Official Administrator		10 00
	Swedish Consul		101 70

CR.

ESTATE OF JOHN TREVOR DAVIES.

1921.			
Jan. 31.	By H. Bostock	$	17 30

ESTATE OF JOSEPHINE EGRESITZ.

1921.			
Aug. 22.	By Sale of watch	$	7 00

ESTATE OF JOHN FRANK.

1921.			
June 23.	By Cash, J. Todd	$	25 00
July 19.	Cash, J. Bulman		50 00

ESTATE OF ALEXANDER FOSTER.

1921.			
Feb. 7.	By Compensation *re* Portage la Prairie lots	$	57 04

ESTATE OF GEORGE W. FLINT.

1921.			
April 15.	By Sale of War bond	$	101 65

ESTATE OF ADAM C. GILLIES.

1921.			
Feb. 23.	By Cash, Whitmore	$	1 50

ESTATE OF ALBERT HANSEN.

1921.			
Jan. 21.	By Danish Consul	$	1 74

ESTATE OF JAMES HILL.

1921.			
Aug. 22.	By Sale of watch	$	1 50

ESTATE OF JOHN HAMMER.

1921.			
Sept. 8.	By Cash, D. Potter	$	100 00
	Credit, D. Potter		70 00

DR.

ESTATE OF ANTONIO INTRANI.

1921.			
May 2.	To Italian Consul	$	201 50

ESTATE OF A. J. IANSON.

1921.			
Jan. 5.	To J. R. Archibald	$	19 05
Feb. 21.	Canadian National Railway		10 00
April 1.	Exchange		15
	Official Administrator		11 00
	J. L. Gordon		80 00
April 5.	R. H. Dwyer		23 72
	Burris, Archibald & Burris		45 68

ESTATE OF JOSEPH JOHNSTON.

1921.			
Nov. 1.	To Exchange	$	0 20
Nov. 3.	J. R. Archibald		33 00
Dec. 1.	Exchange		15
Dec. 7.	Official Administrator		13 84
	Telegram Co.		9 00
	R. P. Bradley		143 50
	Potter Bros.		26 75
	H. P. Weaver		8 50
	Adams River Lumber Co.		6 58
	Mrs. J. H. Barry		22 13

ESTATE OF MAGNUS JOHNSON.

1921.			
May 19.	To Exchange	$	0 20
	Wire to Grant		2 93
May 20.	Wire from Grant		1 96
	Wire to Grant		1 31
May 27.	Fee to Mining Recorder		5 25
	Comeau		171 00
June 1.	Exchange		15
Aug. 15.	R. S. Sargent, Ltd.		28 55
	J. McKay		12 00
	J. Copper		54 00

ESTATE OF ANDERS JANSON.

1921.			
June 1.	To J. R. Archibald	$	31 10
	Official Administrator		6 00

ESTATE OF THOMAS KOROLUK.

1921.			
April 20.	To Wiring Bank of Montreal, Edmonton	$	0 91
May 23.	Exchange		25
May 25.	Bank of Montreal, refund of wiring charges		2 12
June 1.	Exchange		20
	Official Administrator		7 00
	J. L. Gordon		25 00
June 6.	J. R. Archibald		16 00
Oct. 29.	Royal Inland Hospital		11 25

ESTATE OF JOHN LOYER.

1921.			
Aug. 22.	To Auctioneer's fee	$	0 60
	Exchange		02

ESTATE OF ALEXANDER JACKSON LEWIS.

1921.			
Jan. 7.	To Official Administrator	$	14 75
Feb. 1.	C. A. Reid		7 50
Aug. 22.	Auctioneer's fee		45
Sept. 2.	Exchange		02

ESTATE OF TONE LEE.

1921.			
April 1.	To Exchange	$	0 20
	Official Administrator		9 26
	Chinese Consul		566 00

ESTATE OF FRANK LABELLE.

1921.			
Mar. 2.	To Exchange	$	0 05
Mar. 3.	Official Administrator		2 95
Mar. 21.	J. R. Archibald		14 90
	District Registrar		2 50

ESTATE OF DANIEL LEAHY.

1921.			
Oct. 4.	To Official Administrator	$	70
	Royal Inland Hospital		3 38

ESTATE OF CHARLES MARTIN LOVEDAY.

1921.			
Sept. 23.	To R. Loveday	$	17 85

CR.

ESTATE OF A. J. IANSON.

1921.			
Mar. 22.	By Sale of Victory bond	$	99 45

ESTATE OF JOSEPH JOHNSTON.

1921.			
Oct. 6.	By Cash on person	$	8 50
Oct. 20.	Draft from Imperial Bank		147 65
Nov. 4.	Sale of War bond		107 50

ESTATE OF MAGNUS JOHNSON.

1921.			
May 19.	By Norwegian Consul	$	108 56

ESTATE OF ANDERS JANSON.

1921.			
May 28.	By J. W. Jackson	$	30 00

ESTATE OF THOMAS KOROLUK.

1921.			
May 19.	By C.N.R.	$	39 65
May 23.	Bank of Montreal		86 30

ESTATE OF JOHN LOYER.

1921.			
Aug. 22.	By Sale of watch	$	6 00

ESTATE OF ALEXANDER JACKSON LEWIS.

1921.			
Aug. 22.	By Sale of watch	$	4 50

ESTATE OF TONE LEE.

1921.			
Mar. 14.	By Cash, Wong Yim	$	150 00

ESTATE OF FRANK LABELLE.

1921.			
Feb. 28.	By J. DeRoche	$	50 00

ESTATE OF DANIEL LEAHY.

1921.			
Sept. 20.	By D. Leahy	$	4 08

DR.

ESTATE OF A. V. MATTSON.

1921.			
Feb. 7.	To Taxes due by estate	$ 24	55
	Real-estate agent's commission	100	00
	Reston agent's account	237	46
	Premium on Administrator's bond	5	00
	Exchange	1	75
Mar. 2.	,,		80
May 13.	Official Administrator	55	66
	A. K. Cotes	47	90
	Swedish Consul	533	08

ESTATE OF CHARLES MEYERS.

1921.			
Aug. 22.	To Auctioneer's fee	$ 1	35
Sept. 2.	Exchange		05

ESTATE OF LETITIA MAGEE.

1921.			
Oct. 4.	To W. P. Magee	$ 42	26

ESTATE OF ANTON J. MELKIN.

1921.			
Oct. 20.	To C.P.M. Corporation	$ 78	00
Oct. 24.	Exchange	1	25
	Agent's fee	25	00
Nov. 1.	Exchange		60
Nov. 16.	J. R. Archibald	143	05
	Fulton & Co.	135	70
	Official Administrator	294	31
Nov. 24.	District Registrar	286	68
Dec. 2.	R. E. Alexander	24	00
	J. Melkin	688	80

ESTATE OF JOHN NICHOLAS.

1921.			
June 16.	To A. J. McMullen, taxes (advanced by Official Administrator)	$ 4	55

ESTATE OF MIKE POTOSKY.

1921.			
June 9.	To Official Administrator	$ 4	92
	Joseph Potosky	249	79
Oct. 27.	Custodian of Enemy Property	749	38

ESTATE OF GEORGE P. RAVEN.

1921.			
April 1.	To Exchange	$	80
April 2.	Royal Inland Hospital	6	00
	Royal Inland Hospital	224	00
	Drs. Irving & Murphy	47	50
	Drs. Burris, Archibald & Burris	182	00
	W. E. Betts	952	62
	J. W. D. Mackay	40	00
	G. F. Raven	50	04

ESTATE OF WILLIAM JOHN SCOTT.

1921.			
Mar. 2.	To Exchange	$ 0	10

1921.	ESTATE OF JOSEPH SCHEUCHER.		
Sept. 13.	To Borland & McIntyre, agent's account to date (advanced by Official Administrator)	$ 45	97

1921.	ESTATE OF EDWARD O. SKAHL.		
Jan. 5.	To Royal Inland Hospital	$ 13	50
	Irving & Murphy	25	00

1921.	ESTATE OF FRANK SMITH.		
April 8.	To J. L. Gordon	$ 50	00
May 9.	,,	25	00
	A. Miller	3	45
	Drs. Irving & Murphy	1	42

1921.	ESTATE OF GEORGE THOW.		
May 12.	To Collector of Taxes	$ 31	00
May 20.	Fee for copy, letters of administraion	1	00
	Filing in Land Registry		50
	Wire to Mitchell	1	56
June 1.	Exchange		65
	Official Administrator	37	00
	Telegram Co.	18	00
	Mrs. Beattie and J. B. Murray	1,314	99

CR.

ESTATE OF A. V. MATTSON.

1921.			
Feb. 7.	By J. Bingley	$1,006	20

ESTATE OF CHARLES MEYERS.

1921.			
Aug. 22.	By Sale of watch	$ 13	50

ESTATE OF ANTON J. MELKIN.

1921.			
Oct. 24.	By Estate's share of 1920 crop	$ 500	00

ESTATE OF JOHN MCVINNIE.

1921.			
Feb. 23.	By Cash, Whitmore	$ 3	00

ESTATE OF GEORGE P. RAVEN.

1921.			
Feb. 26.	By Kamloops Press, Ltd.	$ 5	32
Mar. 22.	Mrs. Allan	633	96

ESTATE OF WILLIAM JOHN SCOTT.

1921.			
Feb. 3.	By J. T. Scott	$ 64	32

1921.	ESTATE OF GEORGE THOW.		
May 20.	By Palmer	$ 510	00
	Sale of suit-case	2	00

DR.

ESTATE OF DAVID VUKSA.

1921.			
Jan. 17.	To Rade Cviganovich	$	30 50
Dec. 12.	Secretary of Legation of Serbs, Croates, and Slovenes		40 72

ESTATE OF ARTHUR J. WARD.

1921.			
Oct. 25.	To Official Administrator	$	4 00

ESTATE OF JACOB WERNER.

1921.			
Nov. 1.	To Exchange	$	1 40
Nov. 2.	J. L. Gordon		300 60
	District Registrar		16 47
	Official Administrator		54 94
Nov. 3.	J. R. Archibald		35 80
Nov. 4.	Fee for copy, letters of administration		90
	Filing in Land Registry		50
Nov. 8.	W. C. Fowler, account paid by deduction		6 48
	Postages		03
	Filing Fowler lien note		25
Nov. 22.	Filing Lawrence lien note		25
	Filing Cook lien note		25
Dec. 1.	Exchange		20
	M. L. Werner		299 13
	J. McBrady		20 00
	Telegram Co.		9 00

CR.

ESTATE OF JACOB WERNER.

1921.			
Oct. 27.	By Royal Bank	$	1,098 97
Nov. 8.	Sale of stock, etc.		157 00

F. TEMPLE CORNWALL,
Official Administrator.

KASLO AND SLOCAN ELECTORAL DISTRICTS.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1921, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF JOHN BARBARO.

1921.			
Mar. 12.	To Italian Consul	$	2,400 00
April 12.	Donaghy, Brown & Dawson		118 05
April 18.	Italian Consul		141 62

ESTATE OF JAMES WESLEY BATES.

1921.			
Jan. 31.	To H. L. Littlewood	$	50 00
	J. N. McLeod		39 50
	Official Administrator		62
June 6.	"		17
Sept. 9.	"		120 00

ESTATE OF PETER CURRIE.

1921.			
Feb. 11.	To Official Administrator	$	56 18
	Probate duty		65 69
Feb. 21.	Refund to Sheriff, Nelson		66 24
Feb. 26.	Hamilton & Wragge		38 57
Sept. 2.	"		4 50
Sept. 29.	Margaret Dickie (heir)		930 37

ESTATE OF ROBERT DIXON.

1921.			
Aug. 20.	To Official Administrator, Nelson	$	14 90

ESTATE OF JOSEPH EDWARDS.

1921.			
Aug. 31.	To Official Administrator	$	0 40

ESTATE OF JAMES HUNT.

1921.			
April 23.	To Provincial Collector, Revelstoke, taxes	$	8 10
Nov. 12.	Mrs. C. S. Duke (sister)		25 72
	Mrs. R. J. Hutchings (sister)		25 72

CR.

ESTATE OF JAMES WESLEY BATES.

1921.			
Jan. 3.	By Cash on person	$	12 55
Jan. 25.	Sarah E. Arnold		89 35
May 17.	Bank of Montreal		3 45
Sept. 9.	Robert Bates		104 94

ESTATE OF PETER CURRIE.

1921.			
Feb. 11.	By D. H. Nellis	$	1,123 74

ESTATE OF JOSEPH EDWARDS.

1921.			
Aug. 13.	By H. Brean	$	8 00

DR.

ESTATE OF RUSSELL HONE

1921.			
Feb. 18.	To Hamilton & Wragge	$	33 35
Sept. 16.	Kemp & Company		188 50
	D. Brandon		41 08
	Wilson's, Limited		23 62
	Slocan Mercantile Co.		1 31
	E. A. Walton		83
	A. S. MacAulay		13 09
	C. F. Nelson		1 83
	Standard Furniture Co.		6 76
	Office Specialty Co.		1 35
	G. R. Nichol		60 57
Sept. 22.	Gerlach-Barklow Co.		14 88

ESTATE OF GEORGE HEATHERTON.

1921.			
Aug. 31.	To Official Administrator	$	2 44

ESTATE OF OSCAR JOHNSON.

1921.			
Aug. 5.	To J. Blomberg	$	4 38

ESTATE OF DONALD MCINTYRE.

1921.			
Jan. 31.	To Official Administrator	$	0 75
April 14.	G. M. Gunn		7 00
April 30.	Official Administrator		2 50
May 14.	Probate duty		1 65
May 20.	Letters of Administration (original and copy)		3 00
May 31.	R. McKane, costs *re* letters of administration		23 40
July 31.	Official Administrator		7 55
	T. B. Roberts, funeral expenses		146 65
Oct. 17.	Catherine McIntyre (mother)		132 46

ESTATE OF WILLIAM P. SIMPSON.

1921.			
Feb. 25.	To T. H. Wilson	$	128 02
Feb. 26.	Hamilton & Wragge		58 96
April 23.	Mary Wilson (sister)		88 86

ESTATE OF JOHN STREET.

1921.			
Feb. 21.	To O'Shea & Farris	$	29 45
Feb. 28.	Official Administrator		5 00

ESTATE OF JOSEPH A. SWIFT.

1921.			
Dec. 24.	To T. O. Wilson, funeral expenses	$	100 00
Dec. 31.	Charles Tyrell		4 00
	Official Administrator		6 05

ESTATE OF AXEL TEIR.

1921.			
April 1.	To Official Administrator	$	3 15
May 14.	Probate duty		3 81
May 20.	Letters of administration (copy and original)		3 00
May 31.	R. McKane		25 05
June 30.	Official Administrator		26 80

ESTATE OF NICK UZELAC.

1921.			
June 20.	To Copy of letters of administration	$	1 00

ESTATE OF A. C. VAN MOERKERKE.

1921.			
Aug. 23.	To Peter Stongard	$	0 65
	Reuter & Latham		95
	G. H. Murhard		80

ESTATE OF PHILIP H. WALTERS.

1921.			
Aug. 31.	To Funeral expenses	$	36 00

CR.

ESTATE OF GEORGE HEATHERTON.

1921.			
Aug. 9.	By Cash on person	$	48 85

ESTATE OF DONALD MCINTYRE.

1921.			
Jan. 3.	By G. M. Gunn	$	15 00
April 7.	John Corey		50 00
July 5.	Bank of Montreal		116 18
	John Corey		35 00

ESTATE OF JOHN STREET.

1921.			
Feb. 14	By Canadian Pacific Railway Co.	$	100 02

ESTATE OF JOSEPH A. SWIFT.

1921.			
Dec. 17.	By Sale of effects	$	121 05

ESTATE OF AXEL TEIR.

1921.			
Mar. 5.	By Cash on person	$	63 00
June 7.	Bank of Montreal		536 15

ESTATE OF PHILIP H. WALTERS.

1921.			
Aug. 31.	By Sale of effects	$	36 00

RONALD HEWAT,
Official Administrator.

LILLOOET ELECTORAL DISTRICT.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1921, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF FRANK REAL ANGERS.

1921.		
Nov. 12.	To District Registrar, Supreme Court, Ashcroft, probate duty	$ 23 40

ESTATE OF DOMINIC FIORONTE.

1921.		
Nov. 29.	To Naples Romeo, of Ashcroft, certain accounts owing by the deceased paid by Romeo	$ 20 70

CR.

ESTATE OF FRANK REAL ANGERS.

1921.		
Nov. 16.	By Cheque, Royal Bank, Ashcroft	$ 82 19

ESTATE OF DOMINIC FIORONTE.

1921.		
Nov. 12.	By Cash on person, Chief Constable Bowen, Ashcroft	$ 50 00
Nov. 22.	Cheque, Royal Bank, Ashcroft	57 66

ESTATE OF ANDREW SUNDBERG.

1921.		
Dec. 24.	By Cash on person, Superintendent, Lady Minto Hospital, Ashcroft	$ 40 00

R. R. EARLE,
Official Administrator.

COUNTY OF NANAIMO.

(EXCEPTING THEREFROM THE ELECTORAL DISTRICT OF COMOX.)

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1921, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF HENRY BLAKE.

1921.		
Sept. 8.	To Official Administrator	$ 10 43
Aug. 14.	D. J. Jenkins, funeral expenses	50 00
Sept. 9.	Registrar, law-stamps, etc.	3 80
Sept. 12.	J. R. Smith, lot in Cemetery, etc.	24 50
	Chemainus General Hospital	37 60
	M. S. Inglis, medical attendance	48 00
	H. N. Watson, medical attendance	25 00
Oct. 4.	Registrar, probate duty	23

ESTATE OF NORMAN STANLEY CUTHBERTSON.

1921.		
Jan. 14.	To B.C. Telephone Co.	$ 0 70
April 14.	Canadian Bank of Commerce	263 20
Dec. 23.	A. Leighton	5 00

ESTATE OF EMIL EVENSON.

1921.		
July 30.	To Official Administrator	$ 3 30
Aug. 9.	Dominion Express Co.	90
Aug. 26.	Registrar, law-stamps, etc.	2 80
Nov. 11.	Registrar, probate duty	7 50

ESTATE OF WILLIAM DAVID GOODALL.

1921.		
Dec. 12.	To Official Administrator	$ 7 56
Dec. 20.		1 63
	Herald Printing & Publishing Co.	5 28

ESTATE OF WILLIAM KELLY.

1921.		
Oct. 13.	To Registrar, law-stamps	$ 3 50

ESTATE OF LOU CHONG.

1921.		
Dec. 19.	To Official Administrator	$ 1 52

CR.

ESTATE OF HENRY BLAKE.

1921.		
Sept. 8.	By Merchants Bank of Canada	$ 208 71

ESTATE OF EMIL EVENSON.

1921.		
July 30.	By Provincial Constable, Ladysmith	$ 66 00

ESTATE OF WILLIAM DAVID GOODALL.

1921.		
Dec. 12.	By Canadian Bank of Commerce	$ 151 35
Dec. 15.	Grant & McDougall	32 75

ESTATE OF WILLIAM KELLY.

1921.		
Oct. 13.	By C. H. Unsworth	$ 12 60

ESTATE OF LOU CHONG.

1921.		
Dec. 19.	By Victoria Lumber & Manufacturing Co.	$ 30 41

DR.

ESTATE OF ELIZABETH LEAS.

1921.			
Sept. 1.	To Mrs. W. W. Merrow, quarter of $495.64	$	123 91
	Mrs. George E. Leas, quarter of $495.64		123 91
	May L. Copley, quarter of $495.64		123 91

ESTATE OF WILLIAM MILLETT.

1921.			
Feb. 21.	To Deputy Minister of Finance	$	13 60
June 24.	Registrar, law-stamps		1 00
Aug. 16.	Official Administrator		8 55
Aug. 30.	"		25 00
	J. H. Whittome, 5 per cent. on $500		25 00
	Registrar, law-stamps		1 00
Sept. 9.	Official Administrator		38

ESTATE OF MICHAEL O'DONOHUE.

1921.			
Sept. 1.	To Official Administrator	$	10 82
Sept. 15.	Dominion Express Co.		90
July 31.	R. H. Whidden, balance funeral expenses		22 00
Oct. 1.	Duncan Garage, hearse-hire		15 00
Oct. 11.	Registrar, law-stamps, etc.		5 88
Oct. 15.	Official Administrator		2 50
Oct. 25.	"		1 00
Oct. 11.	Registrar, copy of Judge's order		1 00

ESTATE OF A. PELLEGRENELLI.

1921.			
Nov. 30.	To Official Administrator	$	0 50
Oct. 4.	Registrar, law-stamps, etc.		4 60

ESTATE OF EMIL RANTENEN.

1921.			
Jan. 13.	To R. McCallum, 1920 taxes S.W. ¼ Sec. 35	$	19 20
June 1.	Maud Bratton, school taxes and interest		60 95
June 25.	Registrar, law-stamps, etc.		4 30
July 14.	Registrar, probate duty		1 84

ESTATE OF JOHN SCOTT.

1921.			
July 20.	To Registrar, law-stamps, etc.	$	4 70
	Official Administrator		9 32
July 29.	Registrar, Treasury forms, etc.		1 20
	Gregory Tire & Rubber Co.		50 00
Aug. 8.	Cowichan Leader Printing & Publishing Co.		4 20
	Registrar, probate duty		3 34
Aug. 17.	Dominion Express Co.		5 95
Aug. 26.	Registrar, law-stamps, etc.		70
Sept. 12.	Duncan Garage, hearse-hire		17 50
Sept. 2.	Official Administrator		7 50
Mar.	R. H. Whidden		15 50

ESTATE OF WILLIAM SMITH.

1921.			
Dec. 15.	To Official Administrator	$	12 57

ESTATE OF FREDERICK EDWARD READER STUTLEY.

1921.			
July 16.	To Official Administrator	$	24 00
	Registrar, probate duty and law-stamps		10 03
July 29.	Harwood & Harrison		29 10
Sept. 26.	W. McGirr		24 53

ESTATE OF WILLIAM THOMPSON.

1921.			
Jan. 11.	To Geo. Thompson, one-tenth of $3,500	$	350 00
	John Thompson, one-tenth of $3,500		350 00
	Annie Donagh, one-tenth of $3,500		350 00
	Mary Thompson, one-tenth of $3,500		350 00
	Margaret Fawcett, one-tenth of $3,500		350 00
	Emily Tipper, one-tenth of $3,500		350 00
Jan. 14.	Assessor and Collector, taxes, pt. Lot 32		11 00
July 15.	John Thompson, one-tenth of $3,500		350 00

CR.

ESTATE OF WILLIAM MILLETT.

1921.			
Feb. 21.	By J. H. Whittome & Co.	$	271 83
Aug. 16.	J. H. Whittome & Co., interest on mortgage		171 00
Aug. 30.	J. H. Whittome & Co., sale of N. ½ of ½ ac., Sec. 19, Range 5		500 00
Sept. 9.	J. H. Whittome & Co.		7 65

ESTATE OF MICHAEL O'DONOHUE.

1921.			
Sept. 1.	By Deputy Minister of Finance	$	109 10
	Found among effects		10 87
	Canadian National pay-cheques		96 40
Oct. 15.	Joseph Hughes, money loaned		50 00
Oct. 25.	Canadian Bank of Commerce		20 15

ESTATE OF A. PELLEGRENELLI.

1921.			
Nov. 30.	By Provincial Police, Vancouver, found on body	$	10 00

ESTATE OF JOHN SCOTT.

1921.			
July 20.	By Mrs. Kerr	$	27 00
	Canadian Bank of Commerce		159 53
Sept. 2.	Gregory Tire & Rubber Co.		150 00

ESTATE OF WILLIAM SMITH.

1921.			
Dec. 15.	By Royal Bank of Canada	$	130 00
	Cash among effects		14 74
	Granby Consolidated Mining, Smelting & Power Co.		106 67

ESTATE OF FREDERICK EDWARD READER STUTLEY.

1921.			
July 16.	By Canadian Bank of Commerce	$	480 04

ESTATE OF WILLIAM THOMPSON.

1921.			
Jan. 25.	By Collector of Taxes, Alberni	$	1 10

DR.

ESTATE OF FREDERICK VEITCH.

1921.			
June 6.	To Cowichan "Leader"	$ 4	20
June 21.	J. Richardson, wages	47	00
June 30.	Jas. Cathcart, funeral expenses	150	00
July 6.	B.C. Land Investment Agency, insurance on building	7	00
Aug. 15.	Official Administrator	1	20
Nov. 4.	Cowichan Leader Printing & Publishing Co.	10	56
Dec. 5.	Registrar, law-stamps	1	00

ESTATE OF ALFRED SCALES.

1921.			
May 19.	To Deputy Minister of Finance	$ 5	69
May 25.	McAdie Undertaking Co. ..	68	00
June 7.	M. L. Duggan, groceries, etc.	9	00

ESTATE OF ABDULLAH KHAN.

1921.			
May 22.	To Deputy Minister of Finance	$ 53	18
	Registrar, probate duty ..	53	60
	Registrar, law-stamps, etc.	4	80
June 6.	Port Alberni "News" ...	6	16
June 21.	A. Leighton	42	20

ESTATE OF W. CHOYICK.

1921.			
Mar. 30.	To Deputy Minister of Finance	$ 11	35
	H. Vollmers, storage (boat)	12	00
	Herald Printing & Publishing Co.	3	92
April 13.	McAdie Undertaking Co. ..	134	00
May 21.	Nanaimo "Free Press" ..	5	76
May 25.	A. Leighton	51	30

ESTATE OF TONY SABELLA.

1921.			
Jan. 11.	To Deputy Minister of Finance	$ 5	84
	Registrar, probate duty ..		36
	Registrar, law-stamps	2	30
	Registrar, Treasury forms.		20
Jan. 18.	H. Lukula, board bill	23	00
Mar. 4.	Steve Pernick	55	00

ESTATE OF CHARLES WEIRICH.

1921.			
Mar. 18.	To Deputy Minister of Finance	$ 0	50
April 18.	" "	1	00
June 20.	" "		50
July 19.	Official Administrator	15	20
	Corporation of City of Nanaimo	119	35
Aug. 4.	Official Administrator	15	00
Aug. 12.	"		50
Sept. 30.	"	10	40
Oct. 1.	"	5	00
Nov. 30.	"	100	00
Dec. 23.	A. E. Planta, portion of fire-insurance premiums	5	60

ESTATE OF ISAAC G. WHITCOME.

1921.			
Jan. 22.	To Registrar, copy of Judge's order	$ 1	00
Jan. 25.	Collector of Taxes, 1921 taxes, pt. Lot 43	4	73
June 25.	Registrar, law-stamps	1	20
Sept. 3.	"		80
Sept. 2.	Ladysmith "Chronicle," advertising Lot 1 of Lot 43, Oyster District	7	00
Sept. 7.	Official Administrator	45	00
Sept. 16.	J. Stewart, insurance premiums	16	64
Dec. 9.	Mrs. Gladys Butler, board.	128	00
Dec. 14.	Simon Leiser & Co., balance of account	119	08
Dec. 24.	Mrs. Gladys Butler, money loaned	50	50

ESTATE OF HAROLD EDWARD WOODS.

1921.			
Dec. 21.	To Official Administrator	$ 6	21
	Government Telegraph Co., cable to H. N. Woods...	18	16

CR.

ESTATE OF FREDERICK VEITCH.

1921.			
May 27.	By Official Administrator, Victoria	$ 216	81
June 16.	Bank of Montreal, Duncan.	1	54
Aug. 15.	Pension Commissioners	23	95

ESTATE OF ALFRED SCALES.

1921.			
May 17.	By Provincial Police	$ 113	86

ESTATE OF ABDULLAH KHAN.

1921.			
May 10.	By Cheques, $43.91 and $26.04	$ 69	95
May 16.	Canadian Bank of Commerce	993	68

ESTATE OF W. CHOYICK.

1921.			
Mar. 29.	By Sale of launch	$ 227	00

ESTATE OF TONY SABELLA.

1921.			
Jan. 1.	By Pacific Coast Coal Mines, Ltd.	$ 116	80

ESTATE OF CHARLES WEIRICH.

1921.			
Mar. 18.	By J. Gold, interest on mortgage	$	10 00
April 18.	S. Melzer, interest on mortgage		20 00
June 20.	Ditto		10 00
July 19.	Rudd, Mitchell & Co.		304 08
Aug. 4.	S. Melzer, on account of mortgage		300 00
Aug. 12.	J. Gold, interest on mortgage		10 00
Sept. 30.	S. Melzer, balances on mortgage		208 00
Oct. 1.	J. Gold, on account of mortgage		100 00
Nov. 30.	Rudd, Mitchell & Co.	2,000	00

ESTATE OF ISAAC G. WHITCOME.

1921.			
Sept. 7.	By Wm. Rollston	$ 900	00

ESTATE OF HAROLD EDWARD WOODS.

1921.			
Dec. 21.	By Sale of effects	$ 124	25

DR.

ESTATE OF ELISHA McKAY.

1921.			
Jan. 11.	To Deputy Minister of Finance	$	9 56
	Geo. Forrest, balance of funeral expenses		50 00
	Port Alberni "News"		6 10
	A. W. Heath		5 00
	Registrar, law-stamps, etc.		2 50
Jan. 20.	C. M. Whyte		7 45
	A. Croll		60 00
	Alberni Hardware Co.		9 55
	J. R. Morton		40 00
Mar. 17.	Deputy Minister of Finance		2 49
April 17.	G. W. Morgan		47 36

ESTATE OF ERNEST HOSKIN SOADY.

1921.			
Jan. 5.	To A. Leighton	$	3 50
	Elsie Soady		129 94

ESTATE OF ESTEL GERVAIS.

1921.			
Mar. 18.	To L. C. Young	$	3 00
June 16.	Mr. Ironside, shipping trunk to France		17 90

ESTATE OF LOUIS JOHNSON.

1921.			
Jan. 24.	To Andrew D. Larsen	$	30 00
Mar. 2.	John Groftrem, balance of estate		376 97

ESTATE OF MRS. SADIE WEARE.

1921.			
Feb. 21.	To W. J. Weare	$	285 45

ESTATE OF DAVID EDDY.

1921.			
Mar. 11.	To A. Leighton	$	5 00
	John Eddy, quarter of $882.38		220 60
	Annie Jane Waters, quarter of $882.38		220 60
	Bessie Trembath, quarter of $882.38		220 60

ESTATE OF GEORGE CROMPTON.

1921.			
Jan. 14.	To Collector of Taxes, 1921 taxes, real property and school tax	$	19 90

ESTATE OF HENRY BIGGS.

1921.			
Mar. 17.	To Jas. Lorne M. Biggs, one-eighth of $666.96	$	83 37

ESTATE OF J. HEWSON.

1921.			
Jan. 21.	To Corporation City of Prince Rupert, taxes on Lots 22 and 23 (1920)	$	32 61
	Geo. Wallis, one-seventh of $1,400		200 00
	Wm. Robert Hewson, one-seventh of $1,400		200 00
	Mary Jane King, one-seventh of $1,400		200 00
	Thomas Hewson, one-seventh of $1,400		200 00
	John Coulson Hewson, one-seventh of $1,400		200 00
	Thos. Dales, one-seventh of one-third of $1,400		66 68
	Hannah Eliz. Burt, one-seventh of one-third of $1,400		66 66
	Wm. Thomas Dules, one-seventh of one-third of $1,400		66 66
Mar. 12.	Official Administrator		65

ESTATE OF FRANK FROST TALLMAN.

1921.			
Mar. 12.	To George Thompson, Commission paid on $23	$	1 05

ESTATE OF ALBERT FRANCOEUR.

1921.			
Jan. 24.	To Conrad Reifel, money loaned	$	28 00
Jan. 25.	Corporation of City of Nanaimo, 1920 taxes, Sub-lot 48 of Lot 80, Map 357		11 15
June 22.	Corporation of City of Vancouver, 1921 taxes, Lot 48		10 00
Oct. 10.	J. Putnam, clearing Lot 48, Block 80		8 00

CR.

ESTATE OF ELISHA McKAY.

1921.			
Jan. 1.	By sale of effects	$	170 25
	Cash on body		21 00
Mar. 17.	Refund of water licence		49 85

ESTATE OF ESTEL GERVAIS.

1921.			
Jan. 21.	By Chief of Police	$	7 50

ESTATE OF GEORGE CROMPTON.

1921.			
Jan. 25.	By Collector of Taxes, Alberni	$	1 99

DR.

ESTATE OF ROBERT PINKERTON.

1921.			
Mar. 9.	To A. Leighton, legal advice ..	$	10 00
	Maude M. Pinkerton		1,025 45

CR.

S. McB. SMITH,
Official Administrator.

NELSON AND TRAIL ELECTORAL DISTRICTS.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1921, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF WILLIAM PETER BOGART.

1921.			
May 31.	To G. Trickett & Son, funeral expenses	$	93 40
	J. H. Doyle		11 30
Nov. 30.	,, ...		4 08
	O'Shea & Farris, legal		75 00

ESTATE OF BEN CROWTHER.

1921.			
Nov. 30.	To Jesse Crowther	$	86 99
	Joseph Crowther		86 99
	John Crowther		86 99
	George Crowther		86 99
	Robert Crowther		86 99
	Alice Lees		86 98
	Emily Clayton		86 98
	Elizabeth Bowker		86 98

ESTATE OF W. L. DUNSTAN.

1921.			
May 31.	To Drs. Rose & Hartin	$	60 00
Nov. 30.	O'Shea & Farris, legal		10 00
	Peter & Bray, legal		44 00
	Ellen Heather and Emily L. Doble		115 37

ESTATE OF ANDREW G. ERICKSON.

1921.			
June 1.	To Provincial Collector of Taxes	$	12 75

ESTATE OF GEORGE HENRY FISCHER.

1921.			
Nov. 2.	To Mining Recorder	$	20 00

ESTATE OF JOHN JAMES.

1921.			
Mar. 18.	To Assessor and Collector	$	10 15
May 31.	J. H. Doyle		6 72
Aug. 10.	,, ...		2 50
Nov. 30.	,, ...		7 00

ESTATE OF FRED JURAGOWSKI.

1921.			
Nov. 16.	To D. McDonald, legal	$	50 00

ESTATE OF MICHELE LIPPA.

1921.			
Feb. 21.	To Royal Consul-General for Italy	$	1,100 00

CR.

ESTATE OF WILLIAM PETER BOGART.

1921.			
May 30.	By Sale of launch	$	226 00
Nov. 24.	Stumpage on poles		81 60

ESTATE OF JOHN JAMES.

1921.			
Jan. 5.	By Sale of land	$	35 00
Feb. 8.	,, ...		24 85
Mar. 7.	,, ...		25 00
April 8.	,, ...		24 85
May 14.	,, ...		24 85
July 1.	,, ...		25 00
July 9.	,, ...		25 00
Sept. 6.	,, ...		35 00
Sept. 26.	,, ...		34 85
Oct. 28.	,, ...		35 00
Nov. 30.	,, ...		35 00

DR.

ESTATE OF JOHN MICHAEL MULLEN.

1921.			
Mar. 23.	To A. Turnbull, Undertaking ..	$ 258	50
	Dr. J. G. Cunningham	69	00
Aug. 1.	Provincial Collector	15	50
	City of Nelson, taxes	21	65
Aug. 31.	"Daily News"	10	20
Nov. 30.	J. H. Doyle	40	00
	O'Shea & Farris, legal	39	60
	Wm. Malone	122	85
	K. Gannon	122	86
	John Malone	122	86
	K. Malone	122	86
	M. E. Meechan	122	85
	Jane Malone	122	85
	M. M. Bevan	122	85
	Michael Lynch	122	85
	Margaret Lynch	122	85
	P. Lynch	122	85
	S. Lynch	122	85
	C. Lynch	122	85
	T. Lynch	122	85
	M. J. Craig	122	85
	E. A. Craig	122	85
	M. M. Craig	122	85
	T. M. Craig	122	85

ESTATE OF FREDERICK MCCLURE.

1921.			
Sept. 7.	To O'Shea & Farris, legal	$ 12	00

ESTATE OF IWAN NACIUK.

1921.			
Nov. 2.	To Consul-General of Roumania	$1,074	16

ESTATE OF VALENTINO SIMEONI.

1921.			
Aug. 10.	To J. H. Doyle	$ 127	48
Nov. 16.	D. McDonald, legal	155	39

ESTATE OF JERRY O'DONNELL.

1921.			
May 31.	To O'Shea & Farris, legal	$ 47	25

CR.

ESTATE OF JOHN MICHAEL MULLEN.

1921.			
Nov. 22.	By Sale of property	$ 800	00

ESTATE OF VALENTINO SIMEONI.

1921.			
Aug. 6.	By Bank account	$2,549	59

JAMES H. DOYLE,
Official Administrator.

COUNTY COURT, DISTRICT OF NEW WESTMINSTER.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1921, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF JOHN ERHARD WM. ANDERSON.

1921.			
May 25.	To Lampa	$ 12	00
	Gustafson	14	00
June 14.	Matsqui Co-operative Ass'n	55	00
	L. E. Elin, wood	5	65
	G. A. Paterson, merchandise	2	25
	Della Watt, wages	150	00
	J. Larson, wages	20	00
	Alex. T. Hougen	45	00
	Jno. Westlin, baling hay ..	26	10
	W. Hurum, merchandise ...	6	82
	Dr. J. W. Dorby	7	50
	Stener Stenerson, wages ...	68	00
	Emil Lunde, baling hay ...	83	95
	Mary Hougen, straw	38	00
June 20.	A. Edlund, merchandise ...	33	49
July 4.	H. C. Major, commission, expenses, etc.	68	93

ESTATE OF BHAGWAN (PUGWAN) SING.

1921.			
Feb. 8.	To H. N. Lidster, legal	$ 32	00
	H. C. Major, commission ..	51	46

ESTATE OF JOHN BRINKS.

1921.			
Feb. 11.	To H. C. Major, commission, storage, etc.	$ 136	65
	Secretary of State	12,758	81

CR.

ESTATE OF JOHN ERHARD WM. ANDERSON.

1921.			
May 25.	By Canadian Bank of Commerce	$ 916	59
	Mary Houghen, account hay	326	00
June 14.	Kerr & Gustafson	11	13

ESTATE OF BHAGWAN (PUGWAN) SING.

1921.			
Jan. 17.	By Canadian Bank of Commerce	$1,029	24

ESTATE OF JOHN BRINKS.

1921.			
Jan. 13.	By Refund railway Co.	$ 3	15
	Sale of bonds	2,150	00

DR.

ESTATE OF GEORGE COOPER.

1921.			
Mar. 14.	To Children's Aid Society, Vancouver	$	477 78

ESTATE OF HENRY COLVIN.

1921.			
June 6.	To A. D. McBride	$	79 00

ESTATE OF MATTIA CINCINNATO.

1921.			
April 28.	To H. O. Alexander, Official Guardian	$	229 92

ESTATE OF NETTIE VICTORIA CHENHALL.

1921.			
June 8.	To "Columbian," advertising	$	6 96
Aug. 10.	McQuarrie & Martin, legal		36 45
	H. C. Major		28 00

ESTATE OF HERBERT CRABTREE.

1921.			
Aug. 9.	To Receiver-General, income-tax	$	11 62
Aug. 10.	Registering deed and filing letters		4 70
	Canadian Bank of Commerce		25
	J. D. Kennedy, legal		70 00
Sept. 8.	"Columbian," advertising		4 32
	Royal Columbian Hospital		36 46
Sept. 23.	Geo. Hay		2 50
Sept. 30.	S. Bowell, funeral		100 00
	G. E. Drew, professional		50 00
Nov. 16.	Hardacre, 1921 taxes		10 35
	Jervis Trading Co.		3 00
	Hardacre, commission		1 50
Dec. 2.	Geo. Hay		2 50

ESTATE OF JOHN WILLIAM CHAMBERS.

1921.			
Aug. 9.	To Dominion Express, freight on box	$	0 45
Oct. 4.	"Columbian," advertising		5 52

ESTATE OF JAMES DEACON.

1921.			
July 14.	To Prince George "Citizen," advertising	$	3 14
Oct. 21.	Paid for deed		5 00
Nov. 3.	Clute & Johnson, legal		13 75
	H. C. Major		33 77
Dec. 10.	H. C. Major, L.R.O. fees		6 55

ESTATE OF ALEXR. G. DENOON.

1921.			
Oct. 4.	To "Columbian," advertising	$	7 20
Oct. 15.	Mutual Fire Insurance Co., Vancouver		11 20
Nov. 25.	L.R.O., transmission fee		10 00
Nov. 30.	Mortgage and interest		1,055 00
Dec. 1.	Whiteside, Edmonds & Whiteside, legal		51 10
	J. M. Dale, merchandise		79 02
	Ah Lum, wages		137 50
	E. Pope, cemetery lot		10 00
	W. C. Stearman, hardware		127 65
	Dr. McLellan		340 00
	Hammond Cedar Co.		157 40
	Vancouver General Hospital		34 00
	Wm. Warner		13 50
	Taxes, Lot 10		36 39
	S. J. Denoon		175 00
Dec. 7.	S. Bowell, funeral		132 90
Dec. 16.	Clubb & Stewart, merchandise		48 30
	S. J. Denoon		41 42

ESTATE OF CATHERINE EVANS.

1921.			
Nov. 10.	To Murchie & Son, funeral	$	42 50
	H. C. Major, commission		12 27
Dec. 8.	J. W. Allison, legal		47 65

ESTATE OF FREEMAN M. EDDY.

1921.			
Oct. 26.	To Proof of identity	$	1 00
	Release of mortgage		2 50
	Registering release		2 00
	Filing will, order, etc., search		2 00
	Mortgage and register		10 20
	Mark, commission on mortgage and insurance premium		17 00
Nov. 3.	H. N. Lidster, legal		57 00
	"Columbian," advertising		3 60
	H. C. Major, commission		15 00
	G. E. Gilley and Helen Kelly		589 70

CR.

ESTATE OF NETTIE VICTORIA CHENHALL.

1921.			
June 24.	By Bank of B.N.A.	$	560 09

ESTATE OF HERBERT CRABTREE.

1921.			
July 15.	By Royal Columbian Hospital	$	65 60
July 18.	Geo. Hay		23 75
Aug. 9.	Wm. Reeves		50 00
Aug. 10.	North Vancouver		212 15
Aug. 15.	K. D. Crawford		40 00
Aug. 29.	Geo. Hay		23 75
Sept. 23.	"		50 00
Sept. 24.	Coulthard & Sutherland		160 00
Nov. 12.	Interest		5 48
Nov. 16.	Hardacre, rentals		30 00
Dec. 2.	Geo. Hay		50 00

ESTATE OF JOHN WILLIAM CHAMBERS.

1921.			
Aug. 9.	By H. Fooks	$	4 89
Sept. 2.	Bank of Montreal		102 55

ESTATE OF JAMES DEACON.

1921.			
May 9.	By Hasler, land-sales	$	275 00
	Hasler, interest		19 20
Sept. 30.	Land-sale		73 46
Oct. 21.	Hasler		284 60
Nov. 12.	Refund on duty		82

ESTATE OF ALEXR. G. DENOON.

1921.			
Sept. 20.	By Sale of fruit	$	41 42
Oct. 5.	Bank of Hamilton		375 17
Nov. 9.	Brothers		2,100 00

1921. ESTATE OF CATHERINE EVANS.

April 28.	By Attorney-General	$	238 11
June 22.	Mental Hospital		7 39

1921. ESTATE OF FREEMAN M. EDDY.

Oct. 26.	By S. F. Mark, mortgage, order of Court	$	700 00

DR.

ESTATE OF ROBERT FLECK.

1921.			
Jan. 8.	To "Columbian"	$	9 72
Jan. 13.	Clute, legal		57 90
Jan. 29.	National Trust, interest		195 75
	Pritchard, commission		26 64
	Pritchard		5 06
	Exchange		40

ESTATE OF JOHN ROSS FOORD.

1921.			
May 10.	To Taxes, 1921	$	61 19

ESTATE OF PETER FOULDS.

1921.			
June 1.	To "Columbian," advertising	$	3 60
	J. D. Kennedy, legal		23 70
	Murchie & Son, funeral		152 00
	Patterson, Chandler		123 60
	H. C. Major, commission		18 16
	City Treas., seeding grave		2 25

ESTATE OF RICHARD FRANCIS.

1921.			
Nov. 29.	To Auctioneer, commission and advertising	$	67 85
	Exchange on cheque		1 25
	Chilliwack taxes, 1921		426 76
	Official Administrator, expenses to Chilliwack and return		15 15
Dec. 1.	Thos. Donaldson, wages		40 00
	P. Close & Co., merchandise		8 00
	R. J. Henderson, funeral		150 00
	R. E. Smith, auto pall-bearers		6 00

ESTATE OF WM. GRAHAM.

1921.			
Jan. 22.	To R. A. Braden	$	12 50
	Mary Martin		83 39
	David Graham		83 40
	Jane A. Croft		83 40
	Eliza Whitaker		83 40
	Sarah Cook		83 40

ESTATE OF ISAAC GREENWOOD.

1921.			
Feb. 2.	To Mental Hospital	$1,019	22
	H. C. Major		1 00

ESTATE OF JULIA HARRIS.

1921.			
Jan. 10.	To "Columbian"	$	9 00
Sept. 12.	Guardhouse, bond		5 00
Dec. 14.	H. C. Major, taxes		176 50
Dec. 21.	Balance of taxes		140 53
	Registration fee, $16.70; registration of plans, $6		22 70
	Quit-claim deed and letters		1 50
	A. F. Harris, funeral		76 00

ESTATE OF JAMES W. HOLLINSHEAD.

1921.			
Feb. 7.	To Valuator fee, Rich	$	5 00
Feb. 17.	Survey of property		15 00
	1920 taxes		19 90
Feb. 18.	Registrar, copy of letters		1 00
Mar. 23.	Filing release of mortgage		1 00
	Filing copy letters		50
April 1.	Corbould & Grant, legal deed		45 75
	"Columbian"		7 20
	H. C. Major		41 25
	Bank of Montreal, mortgage		688 40

ESTATE OF CARL HENDRICKSON.

1921.			
Mar. 2.	To D. Harris, balance owing on land	$	228 00
	Filing copy of letters of administration		50
Mar. 7.	J. A. Hendrickson, repayment		225 00
	D. Harris, expenses to N.W. *re* deed		5 00
April 1.	Corbould & Grant, legal		36 45
	"Columbian," advertising		8 28
	"Columbian," tenders		5 12
	H. C. Major		66 24
	Carl Carlson		155 00
	T. S. Annandale		8 00

CR.

ESTATE OF JOHN FRASER.

1921.			
May 2.	By Cope, payment to Jan. 2nd	$	60 00
Oct. 3.	Cope, payment to Jan. 11th		60 00

ESTATE OF ROBERT FLECK.

1921.			
Jan. 29.	By Stewart, interest	$	532 80
Nov. 10.	D. Fraser, note		100 00

ESTATE OF PETER FOULDS.

1921.			
April 7.	By Merchants' Bank	$	363 25

ESTATE OF RICHARD FRANCIS.

1921.			
Nov. 19.	By R. J. Harding	$	237 95
Nov. 29.	Auction sale		1,008 65

1921. ESTATE OF ISAAC GREENWOOD.

Jan 17.	By Jno. Gray	$	105 00

1921. ESTATE OF JAMES GIBBS.

Nov. 24.	By F.V.M. Producers' Ass'n	$	70 00

1921. ESTATE OF JULIA HARRIS.

Dec. 21.	By Wm. J. May	$1,400	00

ESTATE OF JAMES W. HOLLINSHEAD.

1921.			
Feb. 7.	By Land-sale	$	50 00
Mar. 23.	Land-sale to Symington		775 00

1921. ESTATE OF CARL HENDRICKSON.

Mar. 1.	By J. A. Hendrickson, advance	$	225 00
Mar. 2.	Yojoro Takimoto, sale of land		1,300 00
Mar. 6.	Royal Bank, Vancouver		14 84

DR.

ESTATE OF GEO. A. HAZLETT.

1921.			
May 12.	To H. C. Major, commission ..	$	49 22

ESTATE OF E. JOHNSON.

1921.			
Mar. 14.	To Expressage on grip	$	0 95

ESTATE OF HENRY F. JONES.

1921.			
Sept. 29.	To Martha Ann Jones	$	100 00
Nov. 21.	Jos. M. Jones (son)		549 75
	Geo. E. Jones (son)		549 75

ESTATE OF THEODOR CHRISTIAN KEMPRUD.

1921.			
April 15.	To Whiteside, Edmunds & Whiteside	$	2 50
Oct. 10.	G. Kemprud (father)		200 00
Nov. 9.	Exchange		50

ESTATE OF DAVID KRISTOFFERSEN.

1921.			
Feb. 12.	To Official Administrator	$	113 06
	Norwegian Consul		1,696 65

ESTATE OF EDWARD KEMPF.

1921.			
May 27.	To Adjustment of taxes, 1921..	$	7 75
June 1.	D. Murchie & Son, funeral..		140 50
	"Columbian," advertising ..		10 80
	A. C. McNab, merchandise..		70 66
	Arnold Kempf		64 35
	J. S. Clute		51 75
June 6.	"Columbian," tenders		11 52
June 20.	H. C. Major		80 69
Nov. 3.	Arnold Kempf		150 00

ESTATE OF E. W. KING.

1921.			
Aug. 5.	To McQuarrie, Martin, Cassady & Macgowan	$	89 05
	Registrar, Supreme Court..		1,538 15

ESTATE OF GEO. D. LESUEUR.

1921.			
May 19.	To Whiteside, Edmonds & Whiteside, legal	$	51 73
	"Columbian"		5 80
	Mental Hospital		641 71
	Chas. Waters		100 00
	H. C. Major, commission ...		73 35

ESTATE OF LIM POY.

1921.			
June 1.	To Lum Ben, funeral	$	166 00
June 7.	R. A. Braden, legal		23 00
	"Columbian," advertising ..		12 96
	H. C. Major, commission ..		20 15
Aug. 29.	Chinese Consul		177 73

ESTATE OF C. LAMBERT.

1921.			
Oct. 10.	To P. R. Keay	$	11 70

ESTATE OF LOUISA LYONS.

1921.			
Jan. 8.	To W. E. Ford—		
	Cash advanced Geo. Lyons	$	40 00
	Managing store, Oct. 1st to Dec. 18th		130 00
	Clerk-hire, Oct. 1st to Dec. 18th, 1920		80 00
	Keep of three children, Dec. 15th to 31st		28 00
	Housekeeping expenses ..		50 00
	5 per cent. commission on $650, book debts		32 50
	Kelly-Douglas account ...		1,008 06
	W. Kellington, taking stock		42 00

CR.

ESTATE OF E. JOHNSON.

1921.			
Mar. 14.	By Coroner Stuart	$	5 20

ESTATE OF THEODOR CHRISTIAN KEMPRUD.

1921.			
Sept. 30.	By Tyson, interest	$	100 00
Nov. 9.	G.W. Saddlery Co.		200 00

ESTATE OF EDWARD KEMPF.

1921.			
May 4.	By Cash on person	$	4 07
May 27.	A. D. Matheson, land-sale..		1,500 00
June 7.	Royal Bank, Langley Prairie		4 87

ESTATE OF JOHN LONGO.

1921.			
Jan. 27.	By Sale of lots	$	150 00

ESTATE OF GEO. D. LESUEUR.

1921.			
Feb. 17.	By Bank of Montreal	$	1,462 00

ESTATE OF LIM POY.

1921.			
April 28.	By Cash, Police	$	62 37
May 4.	Savings account		337 47

ESTATE OF WILLIAM LAING.

1921.			
Feb. 3.	By McQuarrie, Martin, Cassady & Macgowan	$	42 74
June 2.	McQuarrie, Martin, Cassady & Macgowan (Dominion Trust dividends)		15 00

ESTATE OF LOUISA LYONS.

1921.			
Jan. 8.	By W. E. Ford—		
	Store purchase (bonds)..	$	472 25
	Store purchase		27 75
	Kelly-Douglas account ...		1,008 06
	Account		492 00
	Adjustment of insurance.		60 00
	Collection of book debts..		540 08
Jan. 20.	On account book debts ..		55 47
	On account purchase		150 00
Feb. 1.	Book accounts		21 71
Feb. 17.	"		67 40
	Purchase account		150 00
Mar. 17.	"		159 69

DR.

ESTATE OF LOUISA LYONS—*Continued.*

1921.			$	
Jan.	8.	To Merchandise—		
		Wood, Vallance & Leggat	39	84
		Vancouver Breweries	3	06
		United Bakeries, Ltd.	232	51
		Chas. S. Thompson & Son	101	78
		Tisdall's, Ltd.	26	31
		Storry & Campbell, Ltd.	54	62
		Smith, Davidson & Wright	28	49
		Swift Canadian Co.	234	78
		Royal Crown Soap, Ltd.	26	77
		Robertson & Hackett	91	51
		Vancouver "Daily Province"	27	65
		Vancouver "Daily Province," advertising	6	95
		Merchandise—		
		North West Biscuit Co.	69	50
		Nelson & Shakespeare, Ltd.	139	96
		McLennan, McFeely & Co.	294	19
		McKay, Smith, Blair & Co.	41	12
		W. H. Malkin & Co., Ltd.	1,013	30
		E. A. Morris, Ltd.	12	20
		Lincoln, Porter & Co.	28	79
		J. Leckie & Co.	600	10
		Kelly, Douglas & Co., Ltd.	670	74
		Imperial Oil Co.	43	15
		Gault Bros., Ltd.	555	95
		The Fleischmann Co.	5	50
		Cope & Sons, Ltd.	43	56
		Brackman-Ker,	24	30
		P. Burns & Co.	79	08
		Oscar Brown & Co.	143	74
		Carter & Bird, stock inventory	70	00
		Columbian Co., advertising	5	76
		H. C. Major, expense, telegram, fare	22	00
Jan.	20.	W. E. Ford—		
		Commission on debts collected	62	77
		Board of three children	60	00
Feb.	17.	Care of three children	60	00
		5 per cent. on $89.11, book accounts	4	45
Mar.	17.	Care of three children	60	00
April	18.	„ „	60	00
May	6.	Rev. Treasurer, St. Martin's College	193	35
May	9.	Mary Agnes Garland for M. E. Lyons	100	00
May	16.	W. E. Ford—		
		Care of three children	60	00
		5 per cent. commission collected on book debts	2	88
June	17.	Care of three children	60	00
		Cash advanced Geo. Lyons	20	00
July	18.	Care of three children	60	00
Aug.	17.	„ „	60	00
Sept.	19.	„ „	60	00
Nov.	3.	St. Martin's College	58	95
Nov.	18.	Care of children	60	00
Dec.	19.	„	60	00
Oct.	17.	„	60	00

ESTATE OF JAMES LAWLOR.

1921.			$	
Oct.	21.	To Taxes, 1921	4	14
Nov.	1.	J. H. Bowes, legal	44	00
		R. J. Henderson, funeral	115	00
		H. C. Major, commission	21	40

ESTATE OF FRANK PHILLIP MALZARD.

1921.			$	
Jan.	8.	To "Columbian," advertising	3	76
Jan.	10.	"Columbian," tenders	1	50
		H. C. Major, commission	14	35
July	5.	F. M. Malzard	84	89

ESTATE OF WILLIAM M. MINNIKIN.

1921.			$	
Mar.	10.	To Paid charges against C. of T.	6	60
April	1.	Dr. G. E. Drew	90	00
		R.C. Hospital	111	00
		A. Graham	36	30
		Thos. E. Hollinshead	6	00
		W. C. Drewry	23	00
		D. Murchie & Son	56	75
		Corbould & Grant	32	25
		Columbian Co.	9	36
June	3.	A. G. Morse, professional services	55	00
June	23.	H. C. Major, commission	69	55

CR.

ESTATE OF LOUISA LYONS—*Continued.*

1921.			$	
Mar.	17.	By W. E. Ford—		
		Book accounts	31	10
		Interest on agreement of purchase	74	05
April	9.	Book accounts	16	80
April	18.	Purchase account	150	00
May	1.	Interest on bond	2	75
May	16.	Purchase account	150	00
		Book accounts	9	85
June	17.	Purchase account	150	00
June	21.	Book accounts	6	00
July	18.	Purchase account	150	00
Aug.	17.	„	150	00
Sept.	19.	„	150	00
		Interest	82	34
Oct.	17.	Purchase account	150	00
Nov.	18.	„	150	00
Nov.	25.	Interest on bond	2	75
		Book accounts	15	00
Dec.	19.	Purchase account	150	00

ESTATE OF JAMES LAWLOR.

1921.			$	
Sept.	30.	By Merchants' Bank, Chilliwack	133	20
Oct.	31.	Sale of lot	285	00

ESTATE OF WILLIAM M. MINNIKIN.

1921.			$	
Feb.	18.	By Sale of effects	120	00
		Dividend, United Farmers, Ltd.		60
Mar.	1.	A. R. Wright, deposit	125	00
Mar.	29.	A. R. Wright, purchase a/c.	125	00
		Sale, United Farmers, Ltd.	7	35
May	10.	Wright, balance *re* land-sale	1,000	00

DR.

ESTATE OF STEVE MARLEY.

1921.			
	To J. J. Cambridge	$ 26	68
April 12.	H. C. Major, commission	25	03
May 3.	S. Bowell & Son, funeral	73	50
	Jos. Jordan, funeral	15	00
	J. S. Clute, legal	39	40
	Corporation of Delta	57	00
May 6.	W. H. Cullin, King's Printer, advertising	5	00
June 1.	"Columbian"	3	24
	F. Bell	58	45
	D. Bunning	34	46
	E. G. McBride	163	00

ESTATE OF ELIJAH MARTIN.

1921.			
June 17.	To Probate duty	$ 184	87
	Succession duty	484	35
June 18.	Canadian Bank of Commerce	2	50
	" "	1	50
July 5.	J. E. Martin	355	10
	R. A. Braden	57	35
	D. Murchie	169	00
	"Columbian"	13	68
July 22.	Taxes	35	90
	F. T. Hill		45
	F. D. Sinclair	32	00
Aug. 15.	J. E. Martin		75
	Registrar, L.R.O.	1	50
	J. E. Martin	60	00
Nov. 4.	"	10	75

ESTATE OF MASEAS MARIANA.

1921.			
Mar. 1.	To Felip M. Borguez	$ 91	01

ESTATE OF WILLIAM MORAN.

1921.			
Jan. 10.	To "Columbian"	$ 3	60
April 4.	Martin & McQuarrie	44	65
April 7.	"	111	55
	Richard Moran	667	43

ESTATE OF JOSEPH MONGE.

1921.			
July 5.	To M. A. VanRoggen	$ 550	23

ESTATE OF ISAAC J. MADDAUGH.

1921.			
July 15.	To Taxes for 1921	$ 3	75
Sept. 8.	Premium on bond	10	00
Nov. 4.	R. Forsythe	852	85

ESTATE OF NORMAN MARTIN.

1921.			
Jan. 26.	To J. D. Kennedy	$ 695	67

ESTATE OF JESSE JAMES MONKMAN.

1921.			
Jan. 8.	To Delta Municipality, water	$ 5	25
Mar. 12.	Lizzie Monkman	100	00
April 4.	Delta Municipality	5	25
April 15.	Point Grey Municipality, water	2	63
June 1.	Lizzie Monkman	91	35
	Point Grey, taxes	27	00
	" "	21	60
	" "	36	00
June 20.	Lizzie Monkman	100	00
July 4.	Delta Municipality, water	8	25
	Delta Municipality, taxes	164	85
Aug. 13.	Point Grey, water	2	00
Oct. 5.	Delta, water	5	25
Nov. 3.	Lizzie Monkman	225	00
Dec. 14.	Point Grey, water	2	00

ESTATE OF SAMUEL MCLEAN.

1921.			
May 2.	To Government taxes	$ 4	00

ESTATE OF MURDOCK MCKENZIE.

1921.			
July 14.	To Government taxes	$ 12	30

ESTATE OF JOHN MCCONVILLE.

1921.			
May 12.	To H. C. Major, commission	$ 15	67

CR.

ESTATE OF STEVE MARLEY.

1921.			
April 9.	By Police, sale of boat and gun	$ 242	00
April 19.	Bank of Montreal, Ladner	258	76

ESTATE OF ELIJAH MARTIN.

1921.			
June 18.	By Canadian Bank of Commerce	$1,506	40
	Bank of Montreal	719	41
July 5.	J. E. Martin	172	50
	"	25	95
	"	76	48
July 20.	Sale of bonds	1,078	25
July 22.	Sale of land	3,162	90
Aug. 12.	J. E. Martin	21	50
	"	33	60
Aug. 15.	"	540	00
Sept. 9.	"	245	00
	"	15	00
Oct. 1.	Grain-growers' Association	4	50
Nov. 25.	Everall	27	00

ESTATE OF ISAAC J. MADDAUGH.

1921.			
July 15.	By R. Forsythe	$ 850	00

ESTATE OF JESSE JAMES MONKMAN.

1921.			
Jan. 8.	By Chinaman, rent	$ 10	00
Jan. 13.	Usher, interest	60	00
Jan. 20.	Johns, rent	15	00
Feb. 2.	Hodgson, rent	100	00
Feb. 15.	Johns, rent	15	00
Mar. 1.	Hodgson, rent	175	00
Mar. 14.	Johns, rent	15	00
June 13.	Usher, interest	60	00

ESTATE OF SAMUEL MCLEAN.

1921.			
May 2.	By Larson, land-sale	$ 300	00

DR.

ESTATE OF JOHN DONALD MCKAY.

1921.			
July 5.	To "Columbian"	$ 18	00
July 9.	Canadian Bank of Commerce, commission on sale	4	00
	Copy of letters of administration	1	00
Aug. 29.	Murchie, funeral	152	00
	J. D. Kennedy, legal	37	50
	H. C. Major, commission	37	85

ESTATE OF ALEXANDER MCKAY.

1921.			
July 4.	To G. H. Manchester, M.D.	$ 75	00
	St. Mary's Hospital	64	60
	"Columbian"	2	88
	H. C. Major, commission	14	50
	Corbould & Grant	24	40
Sept. 8.	D. Murchie & Son, funeral	100	00

ESTATE OF ALEX. F. MCDONALD.

1921.			
Aug. 15.	To Mrs. A. F. McDonald (heir)	$ 250	00

ESTATE OF DUNCAN ALEX. MCRAE.

1921.			
Dec. 1.	To Whiteside, Edmonds & Whiteside	$ 30	72
	"Columbian"	3	72
	Official Administrator	10	00

ESTATE OF NISHIMURA MASAJIRO.

1921.			
Feb. 22.	To Pearson & Co., insurance	$ 32	50
April 13.	" "	33	50
Sept. 20.	City taxes, Lot 1	33	10

ESTATE OF WILLIAM JOHN NICHOL.

1921.			
Jan. 10.	To "Columbian"	$ 5	40
Feb. 8.	Ellis & Brown	5	00
	Thos. Nichol (heir)	704	17

ESTATE OF ANNIE M. PLEWS.

1921.			
June 3.	To Dr. G. de B. Watson, professional services	$ 20	00

ESTATE OF OLLE PEDERSON.

1921.			
May 6.	To C. L. Remmen (power of attorney for heir)	$ 201	54

ESTATE OF ARTHUR PECK.

1921.			
April 4.	To Vancouver City redemption	$ 41	85
	Vancouver City taxes, 1918–20	76	30
	Filing copy of letters, L.R.O.		50
June 1.	Whiteside, Edmonds & Whiteside, *re* C. of T.	11	50
June 16.	Share 1921 taxes	4	90
Aug. 30.	Taxes paid	2	10

1921. ESTATE OF WILLIAM PATERSON.

Sept. 8.	To "Columbian"	$ 3	60
Oct. 1.	Rachael Clark, half-taxes paid	9	55

ESTATE OF JOHN HENRY QUENAULT.

1921.			
Jan. 8.	To McAdam, insurance	$ 6	80
	Fred Clarkson, merchandise	6	00
	W. J. Whiteside and H. L. Edmonds	176	10

1921. ESTATE OF THOMAS READ.

Feb. 7.	To Point Grey, taxes, 1920	$ 23	44
Mar. 31.	Exchange		45
April 1.	"Columbian," *re* C. of T.	11	00
May 10.	Adjustment of taxes	3	60
June 1.	Corbould & Grant, *re* lost C. of T.	15	00
	H. C. Major, commission	23	75
	Wm. Read (heir)	998	44
	Anna Read (heir)	998	44
	Edith Read (heir)	998	44
	Jas. Alexander (heir)	249	61
	Wm. Alexander (heir)	249	61
	Jane Grushaw (heir)	249	61
	Elizibeth Wilson (heir)	249	61

CR.

ESTATE OF JOHN DONALD MCKAY.

1921.			
June 23.	By Royal Bank	$ 45	83
July 9.	Canadian Bank of Commerce, sale of bonds	708	90

ESTATE OF ALEXANDER MCKAY.

1921.			
June 30.	By F. J. Coulthard, wages	$ 290	00

ESTATE OF DUNCAN ALEX. MCRAE.

1921.			
Nov. 22.	By Carncross & Hugh	$ 44	44

ESTATE OF NISHIMURA MASAJIRO.

1921.			
Jan. 25.	By Rent, Lulu Island property	$ 2	00
Mar. 1.	" "	4	00
Mar. 18.	Tatsu	40	00
Sept. 19.	"	53	75

ESTATE OF ARTHUR PECK.

1921.			
April 4.	By L. Shearer, sale of lots	$ 300	00
June 16.	Welch & Welch, on account	50	00
Aug. 30.	Sale of lots	50	00

1921. ESTATE OF WILLIAM PATERSON.

June 1.	By Police	$ 9	35
July 15.	Merchants' Bank	46	99
Aug. 12.	Ada Chapman, on account	30	00
Oct. 7.	Ada Chapman	30	00
Dec. 9.	"	30	00

ESTATE OF JOHN HENRY QUENAULT.

1921.			
Jan. 8.	By Sale of goods	$ 2	50

1921. ESTATE OF THOMAS READ.

Mar. 2.	By Sale of lots, Point Grey	$ 50	00
Mar. 31.	J. B. Martin, sale of 3 acres	350	00
May 10.	Lots, Point Grey	75	00

DR.

ESTATE OF OSCAR RENAUD.

1921.			
Feb. 21.	To J. D. Kennedy, legal	$	43 86
	D. Murchie & Son, funeral		107 00
	Pineo Bros.		1 50
	West Coast Hospital		25 00
	Government Agent		66 45
Feb. 26.	Dr. C. T. Hilton		30 00
April 1.	"Columbian"		3 00
June 23.	H. C. Major, commission		47 33
Oct. 21.	R. O. Renaud (father), on account		512 95

ESTATE OF JOHN ROBERTS.

1921.			
June 14.	To Whiteside, Edmonds & Whiteside	$	33 32
	D. Murchie & Son		62 00
	"Columbian"		5 04

ESTATE OF CHARLES MORGAN RICHARDS.

1921.			
June 14.	To Chilliwack taxes, 1919 and 1920	$	114 16
July 4.	"Province," tenders		20 15
	"Columbian," advertising		14 04
	T. G. Lewis, funeral and lot		193 00
Aug. 11.	Whiteside, Edmonds & Whiteside, legal		156 99
Nov. 5.	Share 1921 taxes		25 85
Dec. 5.	Whiteside, Edmonds & Whiteside, *re* title		33 45

ESTATE OF OTIS BREMEN REID.

1921.			
May 27.	To Hutchings, balance due on land	$1,019	25
July 4.	Corbould & Grant, legal		41 40
	"Columbian," advertising auction and posters		12 75
	J. W. Berry, auction		72 00
July 28.	Petrie Mfg. Co., Ltd.		39 85
	Anderson		177 50
	Robert Hill		331 45
	Corbould & Grant		15 80
	H. C. Major		90 00

ESTATE OF PETER SMITH.

1921.			
Mar. 21.	To Dr. R. E. Walker	$	13 00

ESTATE OF HANS PETER ALBERT SWANSON.

1921.			
Jan. 12.	To "Columbian"	$	8 10
Mar. 19.	Whiteside, Edmonds & Whiteside, legal		71 60
	R.N. Consulate		2,766 60

ESTATE OF INDAR SINGH.

1921.			
June 6.	To Chandi (wife)	$1,375	99
	Brasant Singh (brother)		1,375 99

ESTATE OF THOMAS DORLAN SHORTS.

1921.			
April 19.	To Kamloops L.R.O., C. of E.	$	4 00
	Expenses to Hope, B.C.		10 00
May 5.	Bass & Bullock-Webster		400 00
May 25.	Government taxes to Dec. 31st, 1921		120 10
Oct. 4.	"Columbian," advertising and tenders		29 76

ESTATE OF JAMES STRONACH.

1921.			
July 4.	To J. H. Bowes, legal and advertising	$	27 10

ESTATE OF HARRY SHAW.

1921.			
May 10.	To Burnaby, taxes, 1921	$	10 00

CR.

ESTATE OF OSCAR RENAUD.

1921.			
Jan. 10.	By Inspector of Municipalities	$	860 98
Feb. 14.	Royal Bank, Alberni		5 66

ESTATE OF JOHN ROBERTS.

1921.			
April 8.	By Abernethy & Lougheed, wages	$	200 45
April 26.	Merchants' Bank		146 29

ESTATE OF CHARLES MORGAN RICHARDS.

1921.			
June 1.	By Moulton, land-sale	$	375 00
July 7.	" "		375 00
Nov. 10.	" "		375 00

ESTATE OF OTIS BREMEN REID.

1921.			
May 4.	By M. E. Reid, deposit *re* purchase	$	180 00
May 27.	M. E. Reid, balance *re* purchase		1,620 00

ESTATE OF JOHN R. B. ROBERTS.

1921.			
Dec. 9.	By Cash on person	$	21 95
Dec. 14.	Brother		35 74
Dec. 17.	Compensation Board		12 80

ESTATE OF THOMAS DORLAN SHORTS.

1921.			
April 19.	By Provincial Police	$	5 25
	Bank of Montreal		458 55
May 25.	Traves, land-sale		250 00

ESTATE OF JAMES STRONACH.

1921.			
June 14.	By Royal Bank	$	74 44

ESTATE OF HARRY SHAW.

1921.			
April 13.	By Geo. P. Shaw	$	4 40

ESTATE OF KENNETH SMITH.

1921.			
Nov. 17.	By Sec., Iron Workers' Union	$	8 75
Nov. 19.	Hamilton Bridge Co., wages		176 63

DR.

ESTATE OF ALICE THORNE

1921.			
Jan. 20.	To Mental Hospital to Dec. 31st, 1920	$	126 53
April 1.	Water rates, commission on rents		10 35
April 7.	Mental Hospital to March 31st, 1921		117 90
June 29.	Calland, commission and repairs		69 25
July 25.	Vancouver, taxes, 1921		144 16
	Mental Hospital to June 30th, 1921		115 10
Sept. 22.	Water rates, Calland, commission		10 35
Sept. 23.	Premium on bonds		38 50
Oct. 10.	Mental Hospital to Sept. 30th, 1921		98 13
Nov. 16.	Miss Thorne		250 00
Dec. 23.	Calland, repairs and commission		12 55

ESTATE OF WM. H. TILLIE.

1921.			
Dec. 9.	To Registrar's fee, filing copy of letters	$	8 75

ESTATE OF ERNEST UOTILA.

1921.			
Jan. 31.	To H. C. Major, amount overpaid Treasury	$	100 00

ESTATE OF A. M. WALKER.

1921.			
April 21.	To J. P. Walker	$	74 16
	Catherine Marshall		74 16
	Mrs. Wm. McCallum		74 16

ESTATE OF ALICE MAUD WORDSWORTH.

1921.			
Jan. 8.	To Exchange	$	0 50
Feb. 1.	Corbould & Grant, legal		43 65
	H. C. Major		20 20
Aug. 16.	Corbould & Grant		10 00
	Diocese of New Westminster, in trust		645 12
	H. C. Major, in trust		655 12

ESTATE OF YEE FIE.

1921.			
Nov. 1	To Clute & Johnston, legal	$	54 40
	S. Bowell & Son, funeral		285 00
	"Columbian," advertising		7 44
	A. A. King, M.D.		10 00
	H. C. Major, commission		96 23

CR.

ESTATE OF ALICE THORNE

1921.			
April 1.	By Calland, rents to April 20th	$	105 00
April 16.	Reddell, interest to March 23rd, 1921		68 00
May 2.	Interest on bonds		94 88
May 13.	Jenks, interest to June 1st, 1921		30 25
	Jenks, principal		29 75
June 29.	Wilson, interest to May 17th, 1921		375 00
	Calland, rentals		105 00
	D. A. Simpson, principal and interest		125 00
Sept. 22.	Calland, rents to Oct. 20th, 1921		105 00
Oct. 1.	Reddell, interest to September 23rd		68 00
Nov. 12.	Interest on bond		82 50
Dec. 15.	Jenks, principal		79 00
	Jenks, interest to December 31st, 1921		41 00
Dec. 23.	Calland, rental		105 00

ESTATE OF WM. H. TILLIE.

1921.			
Nov. 16.	By W. H. McAdam	$	20 00
Dec. 8.	W. H. McAdam, horse, cart, and harness		17 00

ESTATE OF ALICE MAUD WORDSWORTH.

1921.			
Jan. 8.	By Kidd, final land payment	$	400 00
	Interest in full		4 00

ESTATE OF YEE FIE.

1921.			
Oct. 21.	By Royal Bank	$	1,714 73

H. C. MAJOR,
Official Administrator.

OKANAGAN ELECTORAL DISTRICT.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1921, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF W. H. ROSSITER.

1921.			
May 25.	To Telegrams	$	3 24

ESTATE OF OSCAR T. OLSON.

1921.			
Oct. 19.	To Exchange on cheque	$	0 15
Dec. 23.	„		15

ESTATE OF GEORGE CRAWFORD.

1921.			
Dec. 18.	To Mrs. Agnes K. Mills, refund of moneys wrongly credited to this estate	$	62 25

CR.

ESTATE OF W. H. ROSSITER.

1921.			
May 25.	By Cash, Chief Constable	$	13 35

ESTATE OF OSCAR T. OLSON.

1921.			
Sept. 21.	By Cash, Chief Contable	$	21 66
Oct. 19.	E. Hayes, potatoes		9 00
Nov. 22.	Falkland General Store, refund		145 20
Dec. 18.	E. Hayes, proceeds of sale		52 85

D. C. TUCK,
Official Administrator.

OMINECA MINING DIVISION.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1921, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF VICTOR R. SWANSON.

1921.			
Oct. 7.	To R. S. Sargent, Ltd., Telkwa..	$	50 40
	R. S. Sargent, Ltd., Smithers		20 65
	Deputy Minister of Finance		74 75
	Omineca Miner		6 00
	S. H. Hoskins		12 72
	Registration fees		7 80
Nov. 10.	Fisher & Oughton		27 80
	Green Bros. & Burden		105 00

ESTATE OF JOHN BARRETT.

1921.			
July 27.	To Provincial Collector	$	2 00

ESTATE OF ISIDORE BATCHUM.

1921.			
July 28.	To Thorp & Hoops	$	12 35

ESTATE OF FRED. SINCLAIR W. JENNINGS.

1921.			
Oct. 10.	To Provincial Collector	$	7 20

ESTATE OF ERNEST S. CHEATTLE.

1921.			
Feb. 12.	To Deputy Minister of Finance	$	9 22
May 13.	Provincial Collector		29 99
Aug. 18.	S. H. Hoskins		8 37

ESTATE OF HENRY WARD.

1921.			
May 1.	To Deputy Minister of Finance	$	8 00
	"Interior News"		15 20
	Williams, Manson & Gonzales		24 40
Sept. 15.	Registration charges		5 00
	J. Mason Adams		19 35
	Dr. H. C. Wrinch		17 76
	Hazelton Hospital		68 85
	Dr. C. G. G. Maclean		23 10
	Northern Hotel		5 78

ESTATE OF ERIC LINDQUIST.

1921.			
Feb. 12.	To Deputy Minister of Finance	$	1 00
April 8.	" "		1 00
June 2.	" "		1 00
June 11.	Provincial Collector		7 56
Aug. 18.	S. H. Hoskins		1 00
Sept. 7.	Williams, Manson & Gonzales		146 04
	"Omineca Herald"		13 78
	A. G. Sturgeon		2 00
Oct. 5.	S. H. Hoskins		21 00
Oct. 7.	C. J. Peterson		672 53

ESTATE OF CHAS. H. SPENCER.

1921.			
May 1.	To Deputy Minister of Finance	$	2 15
	Williams, Manson & Gonzales		49 35
May 12.	"Omineca Herald"		8 40
	Joe Williams		34 35
	John Utterstrom		34 35
	R. Cunningham & Son		87 75
	Horace E. and F. Smith		362 50
	R. S. Sargent, Ltd.		72 50
	J. C. K. Sealey		67 80

ESTATE OF ERIC PEDERSON.

1921.			
April 8.	To Deputy Minister of Finance	$	11 35
	Peder Olsen Traftensen		215 69

ESTATE OF ALONZA WILSON STULTS.

1921.			
May 11.	To Provincial Collector	$	9 99
Aug. 18.	Williams, Manson & Gonzales		26 00
	"Omineca Herald"		8 80
	Mrs. M. M. Stults		56 60
Sept. 17.	"		18 37
Oct. 5.	S. H. Hoskins		3 25

CR.

ESTATE OF FRED. SINCLAIR W. JENNINGS.

1921.			
May 20.	By. Remittance to Treasury	$	7 20

ESTATE OF ERNEST S. CHEATTLE.

1921.			
Jan. 7.	By Rents	$	184 40
July 23.	"		167 40

ESTATE OF HENRY WARD.

1921.			
April 1.	By G. V. Storkey	$	160 00

ESTATE OF ERIC LINDQUIST.

1921.			
Jan. 7.	By Mrs. A. Leverett	$	20 00
Mar. 3.	"		20 00
May 6.	"		20 00
July 21.	"		20 25
Sept. 3.	W. J. Lockworthy		102 50
Sept. 7.	"		307 50
Sept. 9.	Mrs. A. Leverett		10 00
Sept. 28.	W. J. Lockworthy		50
Dec. 19.	Mrs. Perleberg		30 00
Dec. 20.	Premium		1 80

ESTATE OF CHAS. H. SPENCER.

1921.			
April. 11.	By Union Bank of Canada	$	43 25

ESTATE OF ROBT. F. MACKAY.

1921.			
Dec. 23.	By Canadian National Railway	$	80 25
	" "		4 15

ESTATE OF ERIC PEDERSON.

1921.			
April 8.	By G.T.P. Railway Co.	$	227 04

ESTATE OF ALONZA WILSON STULTS.

1921.			
Sept. 29.	By Hanson Tie Co.	$	65 25

DR.

ESTATE OF WM. HUGH CORBETT.

1921.			
May 27.	To Williams, Manson & Gonzales	$	17 80
June 2.	"Omineca Herald"		5 04
	B.C. Government		40 00
	Dr. H. C. Wrinch		24 30
	Hazelton Hospital		28 80
	Dan Day		18 90

ESTATE OF ROBERT WRIGHT.

1921.			
April 8.	To Williams, Manson & Gonzales	$	22 40
	"Interior News"		6 80
	C. H. Hankinson		43 00
	William Bridgeman		21 75
	Thos. Herlihy		10 00
	Ruby Deering		76 24
	Elizabeth Wright		38 12

ESTATE OF GEORGE FINDLAY.

1921.			
Jan. 17.	To S. H. Hoskins	$	1 00
	Registration fees		6 80
	James Findlay		473 77

ESTATE OF GEORGE DUMNEL.

1921.			
Sept. 9.	To S. H. Hoskins	$	0 75
	"		32

ESTATE OF GEORGE MOORE.

1921.			
Jan. 19.	To J. Mason Adams	$	1 25
April 8.	Deputy Minister of Finance		15 00
	John Kelly		14 00
June 2.	Deputy Minister of Finance		12 50
June 18.	" "		10 00

ESTATE OF KARAL LUIKOVICH.

1921.			
Feb. 12.	To Deputy Minister of Finance	$	1 20

ESTATE OF PETER MACDOUGALL.

1921.			
April 8.	To Deputy Minister of Finance	$	36 39
	Provincial Collector		20 25
	Williams, Manson & Gonzales		205 37
	"Interior News"		6 80
April 19.	Registration fees		11 25
April 20.	Willis McDougall		149 30
	Frank McDougall		149 30
	Ethel Treanor		149 30

ESTATE OF ARTHUR RAMSEY.

1921.			
June 2.	To Deputy Minister of Finance	$	28 25
June 10.	Provincial Collector		3 60
	W. D. Harris		182 00
Aug. 19.	Williams, Manson & Gonzales		48 90
Sept. 21.	"Interior News"		5 60

1921.	ESTATE OF JOHN DOMPIERRE.		
April 8.	To Deputy Minister of Finance	$	0 86
	W. F. Boyer		5 50
June 10.	"		60
June 18.	Deputy Minister of Finance		85 19
	W. E. Smith		10 00
	J. P. MacDonnell		15 00
	Kitsumgallum Cemetery		13 00
	Registrar, Supreme Court		16 59
July 28.	Williams, Manson & Gonzales		53 60
	"Omineca Herald"		8 80

1921.	ESTATE OF SAM LEE—CHIN YUEN.		
June 2.	To Deputy Minister of Finance	$	2 32
Aug. 18.	S. H. Hoskins		5 42
	Williams, Manson & Gonzales		30 00
	"Omineca Herald"		8 80
Dec. 10.	S. H. Hoskins		25

1921.	ESTATE OF WILLIAM MURDOCH.		
May 1.	To Deputy Minister of Finance	$	3 03
June 18.	"		71 81
	J. C. Mitchell		272 50
	Registrar, Supreme Court		159 37
	Jas. MacKay		75 00
	Union Bank of Canada		15 00
	George W. Smith		10 50
	George M. Beirns		77 52
July 28.	"Omineca Herald"		8 80
	Williams, Manson & Gonzales		49 60
Aug. 18.	S. H. Hoskins		73
Dec. 10.	"		1 78

CR.

ESTATE OF GEORGE DUMNEL.

1921.			
Aug. 11.	By John Kelly	$	15 00
Sept. 16.	"		1 50
Sept. 17.	"		5 00

ESTATE OF GEORGE MOORE.

1921.			
Mar. 9.	By D. A. McRae	$	300 00
May 10.	"		250 00
June 13.	"		200 00

ESTATE OF KARAL LUIKOVICH.

1921.			
Jan. 1.	By Constable Fairbairn	$	24 00

ESTATE OF PETER MACDOUGALL.

1921.			
Mar. 14.	By Imperial Bank, Nelson	$	236 07
	Royal Bank, Vancouver		493 89

ESTATE OF ARTHUR RAMSEY.

1921.			
May 10.	By A. Eastment	$	70 10
May 25.	Wm. Harris		495 00

1921.	ESTATE OF JOHN DOMPIERRE.		
Feb. 24.	By Cash among effects	$	17 20
June 9.	Banque d'Hochelaga		58 49
June 13.	Bank of Montreal		1,649 74

1921.	ESTATE OF SAM LEE—CHIN YUEN.		
May 6.	By Constable Cline	$	46 80
July 28.	Union Bank of Canada		108 82
Nov. 8.	J. S. Gray		5 00

1921.	ESTATE OF WILLIAM MURDOCH.		
April 12.	By Constable Cline	$	61 00
June 4.	Union Bank, Hazelton		707 58
June 14.	Department of Public Works		40 00
June 16.	" "		30 97
	Constable Cline		661 00
July 21.	"		15 00
Nov. 28.	Interest on War bonds		8 25
	" "		27 50

DR.

ESTATE OF MARIA DUFF SMITH.

1921.			
July 27.	To "Interior News"	$	5 40
Dec. 10.	Williams, Manson & Gonzales		68 60

ESTATE OF DANIEL ROBT. MACKAY.

1921.			
Oct. 14.	To Williams, Manson & Gonzales	$	46 90
Nov. 12.	"Interior News"		5 80

ESTATE OF CHAS. A. SANDBERG.

1921.			
June 22.	To Deputy Minister of Finance	$	0 91
June 18.	" "		1 25
Aug. 18.	S. H. Hoskins		75
Sept. 9.	"		1 61

ESTATE OF ERNEST JEROME HILL.

1921.			
Aug. 18.	To S. H. Hoskins	$	4 65
Aug. 19.	Provincial Collector, Smithers		22 60
	Receiver-General for Canada		8 48
Oct. 5.	S. H. Hoskins		1 50
	James Cronin		6 50
Nov. 12.	Land Commissioner, C. N. Rlys.		50 00
Dec. 10.	S. H. Hoskins		75
	"		11 85
	W. J. O'Neill		10 00
	Joseph French		250 00

ESTATE OF JOHN MCBRIDE.

1921.			
Jan. 21.	To S. H. Hoskins	$	5 75
	Josephine McBride		54 25

ESTATE OF JAMES SMIBERT SHAW.

1921.			
Aug. 18.	To S. H. Hoskins	$	14 96
Aug. 19.	C. L. Stuart		129 63
Sept. 9.	S. H. Hoskins		3 73
Oct. 5.	"		60

ESTATE OF OSCAR NEWTON BENEDICK.

1921.			
Jan 14.	To S. H. Hoskins	$	2 75

ESTATE OF JAMES DIBBLE.

1921.			
May 27.	To Fisher & Oughton	$	157 50

ESTATE OF THOMAS G. SLOAN.

Feb. 12.	To Estate, Stephenson & Crum	$	65 00

CR.

ESTATE OF MARIA DUFF SMITH.

1921.			
May 25.	By Robt. Duff	$	60 00
Dec. 8.	"		14 00

ESTATE OF DANIEL ROBT. MACKAY.

1921.			
Aug. 16.	By Security for costs	$	75 00

ESTATE OF CHAS. A. SANDBERG.

1921.			
May 11.	By Constable Cline	$	18 25
June 6.	James H. Hevenor		25 00
July 21.	S. Hill		15 00
Aug. 3.	Constable Cline		17 50
Aug. 16.	S. Hill, Jr.		15 00
Dec. 20.	Union Bank, Hazelton		139 05

ESTATE OF ERNEST JEROME HILL.

1921.			
July 22.	By Jas. Cronin	$	93 10
Sept. 24.	"		30 00
Oct. 4.	"		15 00
Nov. 17.	Wm. J. O'Neill		237 00
Dec. 13.	"		17 50
Dec. 16.	W. S. Henry		27 00
Dec. 17.	Peter Pielle		5 00

ESTATE OF JOHN MCBRIDE.

1921.			
July 22.	By Josephine McBride	$	60 00

ESTATE OF JAMES SMIBERT SHAW.

1921.			
July 28.	By Public Works	$	298 83
	Constable Williams		50
Aug. 27.	Nechako Lodge, A.F. & A.M.		75 00
Sept. 28.	Arthur Willzton		12 00
Dec. 23.	Bank of Montreal		82 75

ROBERT J. HILLERBY (Missing). Under "Curator's Act."

1921.			
Oct. 17.	By Cash in register, 45 cents; postage stamps, 61 cents.	$	1 06
Nov. 15.	Bernard Shaw		1 50

ESTATE OF OSCAR NEWTON BENEDICK.

1921.			
Dec. 13.	By Cheque, interest on Victory bond (1917)	$	55 00

STEPHEN H. HOSKINS.
Official Administrator.

REVELSTOKE ELECTORAL DISTRICT.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1921, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF GEO. S. ADAMS.

1921.			
Sept. 7.	To Provincial Collector	$	50 25
Dec. 10.	Commission, O.A.		3 75

ESTATE OF JENNIE C. ANDERSON.

1921.			
Jan. 14.	To Jennie H. E. Anderson	$	272 75

CR.

ESTATE OF GEO. S. ADAMS.

1921.			
Aug. 10.	By F. G. Bews	$	75 00

Dr.			Cr.		
Estate of Gus. E. Anderson.			**Estate of Gus. E. Anderson.**		
1921.			1921.		
Sept. 7.	To Provincial Collector	$ 13 50	Oct. 6.	By J. P. Kelly	$ 800 00
Dec. 10.	Commission, O.A.	40 00			
Estate of Peter John Augustson.					
1921.					
July 18.	To Taxes	$ 45 26			
	,,	72 45			
July 27.	,,	12 48			
July 29.	Magnus Charholm	1,500 00			
Estate of John Chorney.					
1921.					
July 18.	To Chomas Chorney	$1,211 02			
Estate of Angelo Conti.					
1921.					
Mar. 29.	To Official Guardian	$ 885 78			
Estate of Benjamin Gayman.					
1921.					
Feb. 22.	To J. H. Gayman	$ 894 05			
	J. J. Malcolm	3 00			
Estate of Ernestine Giesel.			**Estate of Ernestine Giesel.**		
1921.			1921.		
Dec. 10.	To Marie Giesel	$3,014 40	Oct. 26.	By Molsons Bank	$3,173 03
	Commission, O.A.	158 65			
Estate of Thomas Gillespie.					
1921.					
Dec. 10.	To Rev. W. J. Todd	$1,136 97			
Estate of Rebecca Harvey.			**Estate of Rebecca Harvey.**		
1921.			1921.		
Nov. 4.	To Commission, O.A.	$ 4 50	Feb. 26.	By Rent, Mr. Hind	$ 40 00
	Burridge & Son	3 80	Aug. 10.	,, ,,	60 00
Nov. 29.	S. G. Robbins	25 50			
Sept. 7.	City of Revelstoke	69 75			
Dec. 10.	Commission, O.A.	3 00			
Estate of Hans Mekkel Hanson.			**Estate of Hans Mekkel Hanson.**		
1921.			1921.		
Mar. 4.	To W. I. Briggs	$ 34 35	Feb. 26.	By Wages	$ 496 55
	Commission, O.A.	24 82			
	Probate duty	4 96			
Estate of Ivan Kiseff.					
1921.					
Sept. 7.	To Custodian, Secretary of State	$1,325 50			
Estate of Johan A. Lindbeck.					
1921.					
July 29.	To Magnuss Charholm	$ 245 80			
Estate of Thomas McMahon.					
1921.					
July 27.	To Taxes	$ 214 83			
Estate of John Olm.					
1921.					
Mar. 1.	To Herbert Olm	$ 197 60			
Estate of Mike Stanich.					
1921.					
Mar. 31.	To S. & A. Stanich	$ 713 60			
	Commission, O.A.	30 00			
Estate of John Sweeney.					
1921.					
Feb. 22.	To Commission, O.A.	$ 30 60			
Estate of Soo Lung You.					
1921.					
Feb. 22.	To Shong Chong Co.	$ 251 11			
Estate of Wm. Whitmore.			**Estate of Wm. Whitmore.**		
1921.			1921.		
Aug. 18.	To Molsons Bank	$ 104 00	July 29.	By Molsons Bank	$ 421 08
	Probate duty	23 20	Oct. 6.	M. Remillard	20 00
	Funeral expenses	121 50		O. Westerberg	15 00
	W. I. Briggs	34 30			
	Deputy Provincial Secretary	112 70			
Dec. 10.	Commission, O.A.	21 05			
	,,	1 75			

ARTHUR JOHNSON,
Official Administrator.

ROSSLAND ELECTORAL DISTRICT.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1921, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF HENRY WINTERTON.

1921.			
Feb.	To Probate duty	$	71 21
	Alice Smith		622 47
	Andrew Winterton		622 47
	H. L. Hopkins		207 50
	Alice T. Hopkins		207 50
	Dan H. Hopkins		207 50

ESTATE OF CHARLES JOHNSON.

1921.			
Jan.	To C. F. R. Pincott	$	61 05
	J. M. Jordan		165 00

ESTATE OF J. R. CRANSTON.

1921.			
Jan.	To C. F. R. Pincott	$	288 25

ESTATE OF D. BIANCHI.

1921.			
April	To C. F. R. Pincott	$	27 10

ESTATE OF JOHN SLOAN.

1921.			
Feb.	To C. F. R. Pincott	$	78 25
June	„		171 39
Dec.	Saskatchewan Guarantee & Fidelity Co.		36 00

CR.

ESTATE OF HENRY WINTERTON.

1921.			
Feb.	By Cash	$	5 50

ESTATE OF CHARLES JOHNSON.

1921.			
Jan.	By Cash	$	250 00

ESTATE OF NER SMITH.

1921.			
Nov.	By Cash	$	340 00

ESTATE OF CHARLES DUNDEE.

1921.			
Feb.	By Cash	$	49 85

ESTATE OF W. R. MELLARD.

1921.			
Jan.	By Cash	$	30 00
April	„		18 00

ESTATE OF SAMUEL ALLEN.

1921.			
Sept.	By Cash	$	2 25
	„		1 00
	„		1 00

ESTATE OF J. R. CRANSTON.

1921.			
Jan.	By Cash	$	200 00
	„		400 00

ESTATE OF D. BIANCHI.

1921.			
Jan.	By Cash	$	300 00

ESTATE OF JOHN SLOAN.

1921.			
Jan.	By Cash	$	750 00
	„		527 50
Nov.	„		923 49

H. R. TOWNSEND,
Official Administrator.

SIMILKAMEEN ELECTORAL DISTRICT.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1921, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF HATTIE MCBRIDE.

1921.			
Sept. 16.	To A. S. Black, legal expenses	$	60 05
	"Princeton Star," advertising		4 50
	J. R. Brown, commission		348 21
	N. McDonald, funeral expenses		235 00

ESTATE OF JEREMIAH PETREL FRAME.

1921.			
Feb. 15.	To R. M. Tilton, hay	$	250 00
May 19.	H. G. Sellars		50 00
	D. A. Archibald		113 00
June 8.	R. M. Tilton, balance		65 00
Oct. 17.	Commission		15 60

CR.

ESTATE OF HATTIE MCBRIDE.

1921.			
Sept. 15.	By Canadian Bank of Commerce, Princeton	$	6,964 21

ESTATE OF JEREMIAH PETREL FRAME.

1921.			
Sept. 10.	By Canadian Bank of Commerce, Princeton	$	312 05

Dr.			Cr.		
	ESTATE OF F. HOLMBERG.			ESTATE OF F. HOLMBERG.	
1921.			1921.		
Sept. 16.	To J. R. Brown, commission...	$ 15 85	Sept. 15.	By Bank of Montreal, Princeton	$ 317 25
	A. S. Black, legal expenses	39 54			
	Burial expenses	140 00			

JAS. R. BROWN,
Official Administrator.

SKEENA RIVER AND QUEEN CHARLOTTE MINING DISTRICT.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1921, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

Dr.			Cr.		
	ESTATE OF JOHN POST.				
1921.					
Mar. 14.	To Registrar, Births, Deaths, and Marriages	$ 0 75			
	ESTATE OF S. E. STEBBINS.				
1921.					
Sept. 9.	To Taxes	$ 34 22			
Oct. 11.	Taxes, balance	3 39			
	ESTATE OF JOHN KOSKI.				
1921.					
Mar. 4.	To Consul-General for Sweden	$ 258 55			
	ESTATE OF SAM FAGERLAND.				
1921.					
June 15.	To Collector, North Vancouver, taxes	$ 5 70			
	ESTATE OF H. MPOUTSAS.				
1921.					
Mar. 1.	To Probate	$ 2 49			
Mar. 2.	Patmore & Fulton	28 15			
Mar. 8.	News Printing & Publishing Co.	8 50			
	Prince Rupert Hospital ...	10 00			
	Consul-General for Greece.	148 92			
	ESTATE OF D. J. RAINEY.				
1921.					
Jan. 27.	To Patmore & Fulton	$ 87 00			
Aug. 6.	F. P. Rainey	479 47			
	ESTATE OF STANLEY WOZNEY.				
1921.					
Sept. 9.	To Custodian, Alien Enemy Property, Ottawa	$ 921 49			
	ESTATE OF FRANCESCO MANDAIO.				
1921.					
June 18.	To Consul-General for Italy ..	$1,556 23			
	ESTATE OF PAUL OSA.				
1921.					
Oct. 26.	To Marguerita Osa	$ 475 04			
	ESTATE OF W. McK. LOGAN.				
1921.					
Jan. 27.	To Patmore & Fulton	$ 151 39			
	ESTATE OF TONY LUCICH.				
1921.					
July 26.	To Haynor Bros., monument and place of burial	$ 141 31			
	ESTATE OF PETE LYSYK.			ESTATE OF PETE LYSYK.	
1921.			1921.		
Sept. 9.	To Prince Rupert Hospital ...	$ 84 00	Sept. 27.	By Prince Rupert Hospital, refund bill paid by W. C. B.	$ 84 00
	ESTATE OF JOS. BROWN.				
1921.					
July 21.	To J. H. McMullin, filing P.A. and L.A.	$ 1 00			
	Miss Helen Brown	92 37			
	Mrs. M. Sterling	92 38			
	ESTATE OF G. JOHANNSSON.				
1921.					
Mar. 4.	To Consul for Denmark	$ 962 11			

DR

ESTATE OF CHARLES SWANSON.

1921.			
Jan. 7.	To Deputy Minister of Finance	$ 133	33
	Consul-General for Sweden..	1,162	48
	F. A. Swanson	1,162	48
Jan. 15.	Taxes, Black Bear, 1921 ..	13	00
July 18.	Consul-General for Sweden	1,007	77

ESTATE OF GEORGE FEELIS.

1921.			
Jan. 6.	To Granby Co. Blac., funeral..	$ 29	35

ESTATE OF E. M. HAYNES.

1921.			
Jan. 6.	To Deputy Minister of Finance, commission	$ 45	00
	F. Haynes	167	79
	A. R. Haynes	167	79
	Ruth A. Haynes	83	90
	Jessie M. Haynes	83	90
	L. J. Barnard	55	93
	Mrs. E. Andrews	55	93
	Mrs. R. C. Brown	55	93

ESTATE OF ERNEST CARLSON.

1921.			
Feb. 3.	To Deputy Minister of Finance	$ 134	81
	Consul-General for Sweden.	640	00
	V. O. Carlson (brother)...	640	00
	A. E. V. Carlson	640	00
Oct. 14.	Consul-General, for J. P. Carlson	3,590	00

ESTATE OF R. J. DUNN.

1921.			
Mar. 7.	To Patmore & Fulton	$ 25	00
Mar. 22.	John Dunn	1,607	68

ESTATE OF ALFRED KYTE.

1921.			
Mar. 2.	To Deputy Minister of Finance, commission	$ 59	00
June 15.	McCaffery Gibbons, fire insurance	109	00
Nov. 24.	Mrs. Coleman	92	21
	Agnes Kyte	951	29

ESTATE OF ELI. KNUTSON.

1921.			
Jan. 8.	To Patmore and Fulton	$ 13	00
Jan. 13.	,, ,, ...	36	55
Jan. 15.	News Printing & Publishing Co.	8	50
Feb. 3.	Deputy Minister of Finance	20	00
	Dr. W. T. Kergin	234	50
Feb. 16.	Sarah Alfson, residue	81	71
	Ole Alfson	81	71
	Lena Larson	81	71
	Annie Halverson	81	71
	Andrew Alfson	81	71
	Alf Alfson	81	71

ESTATE OF AARON NELSON.

1921.			
Aug. 5.	To Fisher & Oughton	$ 78	00
Sept. 16.	Probate duty	68	00
Oct. 20.	Swedish Consul-General ...	4	71
Nov. 4.	Mrs. Julia McDonald	123	86
	Albert Nelson	123	87
	Consul-General for Sweden	123	87
	Nels G. Nelson	619	34
	Edla Johnson	88	47
	H. Goodfellow	88	47
	Herbert Nelson	88	47
	Jennie Nelson	88	47
	Louise Nelson	88	48
	Walter Nelson	88	48
	Hilda Nelson	88	48
Dec. 13.	Swedish Consul	123	86

ESTATE OF F. R. GIERTSON.

1921.			
Jan. 15.	To Northwestern Trust Co. ..	$ 40	30
July 26.	,, ,, ..	570	00

ESTATE OF GUSTAVE GEORGE.

1921.			
Jan. 6.	To Patemore & Fulton	$ 20	00
Jan. 13.	Madame Clement	77	33

CR.

ESTATE OF ERNEST CARLSON.

1921.		
Jan. 17.	O. Evindsen, payment on bond, North Star Group	$2,696 25

ESTATE OF ALFRED KYTE.

1921.		
Feb. 24.	By Second payment, Canadian Laundry	$1,000 00
	Interest	180 00

ESTATE OF ELI. KNUTSON.

1921.		
Jan. 5.	By Knute Olson, final payment, Lot 1429, Range 5	$ 350 48

ESTATE OF F. R. GIERTSON.

1921.		
July 7.	By W. S. Fisher, second payment, Lots 15 and 16, Blk. 7, Sec. 6, Prince Rupert	$ 500 00
	Interest to April 19th, 1921	70 00

DR.

ESTATE OF WILLIAM SELIG.

1921.			
Jan. 6.	To Adam Selig, residue	$1,366	44
April 6.	„ „	218	88

ESTATE OF WILLIAM STRATFORD.

1921.			
April 28.	To Exchange on cheque	$ 0	85
June 15.	Patmore & Fulton	7	50
Oct. 4.	Deputy Minister of Finance	23	50
Oct. 20.	W. Moberley	20	00
	Mrs. J. Stratford, residue	373	15

ESTATE OF ROBERT A. GRANT.

1921.			
Mar. 8.	To Taxes on Lot 2376, Cassiar	$ 24	00
July 23.	W. J. B. Wilson	1,900	00
Sept. 9.	Deputy Minister of Finance	32	50
	W. J. B. Wilson	617	50
Oct. 4.	Deputy Minister of Finance	2	75
	W. J. B. Wilson	52	42
Nov. 4.	Deputy Minister of Finance	25	00
	W. J. B. Wilson	475	00

ESTATE OF E. P. GINGRAS.

1921.			
July 30.	To Mrs. Gingras (mother)	$ 191	87

ESTATE OF CARL R. CARLSON.

1921.			
Feb. 3.	To Deputy Minister of Finance	$ 25	56
	Consul-General for Sweden	600	00
June 15.	Taxes, Lot 15, Blk. 8, Sec. 7, Prince Rupert	7	71
Oct. 4.	Deputy Minister of Finance, commission	22	10
	Consul-General for Sweden	450	00

ESTATE OF C. W. HESS.

1921.			
Aug. 20.	To J. L. Peterson, residue	$1,022	53
Oct. 4.	Deputy Minister of Finance	78	93
	J. L. Peterson, residue	1,499	82

ESTATE OF J. B. DODSON.

1921.			
Mar. 7.	To Patmore & Fulton	$ 6	50
Oct. 4.	Deputy Minister of Finance	85	58

ESTATE OF JOHN HERSTICK.

1921.			
June 15.	To Taxes, Lots 5 and 6, Blk. 11, Sec. 7, Prince Rupert	$ 15	42

ESTATE OF MAH WING.

1921.			
April 26.	To Mah Gin Duck, Administrator	$ 136	00

ESTATE OF J. CHAPMAN.

1921.			
Jan. 4.	To Granby Co., Hospital account	$ 10	75

ESTATE OF R. O. FULLBROOK.

1921.			
Feb. 15.	To Taxes, Lot 1707, for 1920	$ 10	00
Mar. 7.	Patmore & Fulton	7	50
April 6.	A. E. Fullbrook	2,871	03

ESTATE OF E. K. OLSON.

1921.			
April 28.	To Exchange on cheque	$ 0	25
Feb. 7.	Patmore & Fulton	20	00
June 15.	Ormes, Ltd., photos		50
Oct. 6.	Deputy Minister of Finance		60
	Consul-General for Norway	322	09

CR.

ESTATE OF WILLIAM SELIG.

1921.			
Mar. 29.	By Refund of probate overpaid	$ 12	99
	Refund of succession duty overpaid	205	89

ESTATE OF WILLIAM STRATFORD.

1921.			
April 15.	By Balance purchase price, Lot 2350, Cassiar, from J. J. McNeil	$ 380	00

ESTATE OF ROBERT A. GRANT.

1921.			
April 26.	By Sale, Prince Rupert Club debentures	$ 150	00
April 28.	H. B. Rochester, first payment	500	00
June 28.	H. B. Rochester, second payment	500	00
Aug. 19.	O. Hanson, Lot 2376, Cassiar	650	00
Sept. 12.	E. F. Doyle, payment on note	50	00
Sept. 13.	Premium on cheque	5	17
Oct. 31.	H. B. Rochester, third payment	500	00
Dec. 23.	H. B. Rochester, fourth payment	500	00

ESTATE OF CARL R. CARLSON.

1921.			
Sept. 19.	By Dybhavn & Hanson, payment on Lot 7, Blk. 35, Sec. 5, Prince Rupert	$ 400	00
	Interest, Dec. 18th, 1920, to Sept. 18th, 1920	42	00
Dec. 10.	Dybhavn & Hanson	405	75

ESTATE OF C. W. HESS.

1921.			
Sept. 13.	By Sale of Victory bonds, 15 @ $100	$1,455	00
	Sale of 45 coupons @ $2.75	123	75

ESTATE OF J. B. DODSON.

1921.			
Sept. 7.	By Imperial Bank, Forestburg	$1,711	79

ESTATE OF E. K. OLSON.

1921.			
April 28.	By Sale of equity, Lot 6, Terrace, per L. H. Kenny	$ 80	31
Sept. 13.	Sale of camera	12	00

ESTATE OF AMORATA DAGOSTINI.

1921.			
Sept. 12.	By Workmen's Compensation Board, funeral	$ 55	00

DR.

ESTATE OF J. SEPLA (SEPPLA).

1921.			
Feb. 14.	To Farris & Emmerson	$ 5	00
	Lusa Seppla	2,745	73
Mar. 1.	Balance of probate	22	55
	Lusa Seppla	2	00

ESTATE OF M. SADOBIWISKE.

1921.			
April 9.	To Surf Inlet Mines	$ 50	00

ESTATE OF JOHN ELLWOOD.

1921.			
Mar. 14.	To News Printing & Publishing Co.	$ 8	50
	Patmore & Fulton	44	05
April 26.	"	22	20
	Mrs. Ellwood	271	05

ESTATE OF RODERICK FRASER.

1921.			
June 15.	To Geo. Fraser	$ 20	39

ESTATE OF JOHN MELVIN.

1921.			
Jan. 7.	To Funeral expenses	$ 24	20

ESTATE OF DONALD FRASER.

1921.			
Jan. 4.	To Patmore & Fulton	$ 46	05
Jan. 15.	News Printing & Publishing Co.	8	50
Feb. 3.	Deputy Minister of Finance	72	71
	Probate duty	59	54

ESTATE OF DAVID HANLEY.

1921.			
Jan. 4.	To Patmore & Fulton	$ 32	55
Jan. 15.	News Printing & Publishing Co.	8	50
Feb. 3.	Probate	6	50
	Deputy Minister of Finance	48	31
Nov. 4.	J. Hanley	130	23
	W. J. Hanley	130	23
	Annie Scott	130	23
	Wm. Pyper, Jr.	65	12
	David Pyper	65	12

ESTATE OF JAS. MATHESON.

1921.			
Jan. 27.	To J. L. Barge, funeral	$ 150	00
	Patmore & Fulton	33	15
Feb. 3.	Probate	16	47
	Deputy Minister of Finance	24	97
Feb. 4.	News Printing & Publishing Co.	8	50
Feb. 11.	Graham Island Farmers' Institute	46	00
Mar. 8.	Albert Beebe	20	00
July 26.	Robert Scharffe	11	04
Oct. 22.	Wm. Brinkner	30	00
Nov. 1.	Robert Matheson	33	25
	Lizzie Morris	33	25
	Annie Hodgson	33	26
	Ada Morse	33	26
	Jessie Matheson	33	26

ESTATE OF GEORGE NEWMAN.

1921.			
Jan. 6.	To Exchange on cheque	$ 8	20
Feb. 3.	Probate	166	19
	Lakelse Lumber Co.	25	50
	Kitsumgallum Cemetery	13	00
	Thos. Masterton	10	00
	G. Edwards	10	00
	Deputy Minister of Finance	174	50
	Patmore & Fulton	46	15
	News Printing & Publishing Co.	8	50

ESTATE OF KYUSHICHIRO KOBAYASHI.

1921.			
Jan. 4.	To Probate	$ 12	77
Jan. 15.	News Printing & Publishing Co.	8	50
Jan. 17.	T. B. Hooper, solicitor	72	45
Feb. 3.	Deputy Minister of Finance	78	92
	H. Mochida	52	50
July 26.	Haynor Bros.	160	00

CR.

ESTATE OF RODERICK FRASER.

1921.			
Jan. 14.	By Cash	$ 3	05

ESTATE OF DAVID HANLEY.

1921.			
Jan. 12.	By Boiler-makers' Union, funeral benefit	$ 300	00
	Premium on U.S. cheque	41	23
June 17.	Wages, Prince Rupert Dry Dock	227	14

ESTATE OF JAS. MATHESON.

1921.			
Jan. 6.	By Bank of Commerce	$ 422	97
Feb. 23.	Pension cheque	6	85

ESTATE OF GEORGE NEWMAN.

1921.			
Jan. 6.	By Bank of Montreal	$3,356	70
Jan. 12.	G.T.P., wages to Nov. 15th, 1920	78	40
	G.T.P., wages to Nov. 30th, 1920	49	35

ESTATE OF KYUSHICHIRO KOBAYASHI.

1921.			
Jan. 2.	By Bank of Montreal, Vancouver	$ 473	20

DR.

ESTATE OF ANDREW OLSON.

1921.		
Jan. 31.	To B.C. Undertakers, funeral..	$ 125 00
Feb. 3.	Deputy Minister of Finance	79 07
	P. DeBoer	20 00
Feb. 7.	Probate	19 23
Feb. 14.	Patmore & Fulton	46 15
Mar. 8.	News Printing & Publishing Co.	8 50
June 16.	Wm. Dahl, bill of sale	500 00
June 18.	Free miners' certificate (special)	15 00
Aug. 23.	Fisher & Oughton	20 00
Sept. 6.	Dr. Kergin	9 00

ESTATE OF CHARLES WILLIAMS.

1921.		
Jan. 28.	To Exchange on Bank of Montreal, cheque	$ 1 25
Jan. 29.	W. Meggerson, services as nurse and bringing deceased to Hospital	50 00
Jan. 31.	Haynor Bros., funeral	175 00
Feb. 3.	Deputy Minister of Finance	33 41
Feb. 5.	Dr. C. A. Eggert	90 00
Feb. 7.	Probate	19 90
Feb. 14.	Patmore & Fulton	33 46
	F. R. Campbell, drugs	7 75
Feb. 22.	Geo. Little	9 00
Mar. 8.	News Printing & Publishing Co.	8 50

ESTATE OF JOS. E. BOOTH.

1921.		
Feb. 22.	To J. L. Barge, funeral	$ 90 00
June 18.	Collector, Prince Rupert, taxes	8 67
Nov. 29.	Registrar, probate duty	3 90
	Patmore & Fulton	36 50
	News Printing & Publishing Co.	8 50

ESTATE OF DANIEL MCDONALD.

1921.		
Feb. 3.	To Deputy Minister of Finance	$ 4 19
Sept. 20.	Government Agent, law-stamps	2 10
	Probate	83
	Mrs. Jacobs	76 81

ESTATE OF V. F. G. GAMBLE.

1921.		
Feb. 3.	To Deputy Minister of Finance	$ 1 32
	Probate	5 00
	News Printing & Publishing Co.	8 50

ESTATE OF R. E. DUGAN.

1921.		
Jan. 31.	To B.C. Undertakers	$ 200 00
Feb. 3.	Deputy Minister of Finance	17 66
Feb. 7.	Prince Rupert General Hospital	5 00
Feb. 14.	Patmore & Fulton	27 90
	Registrar, Births, Deaths, and Marriages	75
Mar. 8.	News Printing & Publishing Co.	8 50
April 7.	B.C. Undertakers	66 40
	Dr. W. T. Kergin	27 00

ESTATE OF WILFRED REDDIHOUGH.

1921.		
April 6.	To Deputy Minister of Finance	$ 42 78
	Probate	7 50
	Patmore & Fulton	56 05
	News Printing & Publishing Co.	8 50

ESTATE OF GEO. ROSS.

1921.		
Feb. 28.	To B.C. Undertakers	$ 100 00

CR.

ESTATE OF ANDREW OLSON.

1921.		
Jan. 28.	By Royal Bank	$1,548 14

ESTATE OF CHARLES WILLIAMS.

1921.		
Jan. 7.	By Cash, Hospital	$ 133 35
Jan. 22.	Sale of barber-chair, etc.	35 00
Jan. 28.	Bank of Montreal	500 00

ESTATE OF EMILIO SEDRAN.

1921.		
Jan. 8.	By Government Agent, Anyox.	$ 8 50
Feb. 24.	Golskeich Mines, wages	90 25

ESTATE OF MIKE SOKOLOVSK.

1921.		
Jan. 14.	By Government Agent, Anyox.	$ 35 00

ESTATE OF JOS. E. BOOTH.

1921.		
Jan. 14.	By Cash	$ 108 55
	Sale of gas-boat "Tillie" and effects	371 80

ESTATE OF DANIEL MCDONALD.

1921.		
Jan. 17.	By Whalen Pulp & Paper Mills, wages	$ 83 93

ESTATE OF V. F. G. GAMBLE.

1921.		
Jan. 18.	By S. Harrison	$ 26 40

ESTATE OF R. E. DUGAN.

1921.		
Jan. 28.	By Bank of Montreal	$ 353 21

ESTATE OF WILFRED REDDIHOUGH.

1921.		
Feb. 24.	By Interest on cheques on Victory Bonds, June, 1918, to Dec., 1920	$ 122 38
Mar. 29.	Sale of Victory bonds	733 37

ESTATE OF GEO. ROSS.

1921.		
Feb. 24.	By Sale of boat "Harvest Home"	$ 120 00

DR.

ESTATE OF J. MATSUMOTO.

1921.			
Nov. 18.	To law-stamps	$	2 20
	Minister of Finance, commission		5 58
	H. Matsumoto		104 01

ESTATE OF H. R. DYKE.

1921.			
Mar. 31.	To B.C. Undertakers	$	200 00
Sept. 8.	Registrar, certified copy of letters of administration.		1 00
Sept. 27.	Consular fees paid by J. H. McMullin		2 90
Nov. 4.	Pacific Cartage		8 40
	Minister of Finance		87 60
	Patmore & Fulton		45 15
	Probate		15 27
	"Daily News"		8 50

ESTATE OF IDA M. RIDER.

1921.			
April 7.	To Williams, Manson & Gonzales	$	79 25
	Deputy Minister of Finance		29 13
	"Daily News"		8 50
Oct. 11.	Burns Powell		44 55
	Dunning & McEntee		125 00
	Portland Surgical Hospital.		185 20
	Dr. Coffey Jones & Co.		111 15

ESTATE OF HENRY H. ROWE.

1921.			
April 7.	To Williams, Manson & Gonzales	$	94 26
	Deputy Minister of Finance		5 31

ESTATE OF JOSEPH LESKOSKI.

1921.			
Sept. 16.	To B.C. Undertakers	$	125 00
Sept. 17.	J. H. Burrough, for N. McN. Smith, nurse		35 00
Oct. 4.	Deputy Minister of Finance		15 72
	Patmore & Fulton		27 65
	"Daily News"		8 50
	Prince Rupert Hospital		47 55
	Dr. W. T. Kergin		47 06
	Probate duty		7 09

ESTATE OF A. W. SCOTT.

1921.			
Aug. 8.	To Probate	$	0 50
Sept. 6.	"Daily News"		8 50
Oct. 17.	Patmore & Fulton		27 65
Nov. 4.	Deputy Minister of Finance		25 84
Dec. 1.	Steen & Longwill		2 00
	Resources Publishing Co.		2 00
	W. J. McCutcheon		9 35
	Howe & McNulty		31 35
	Munro Bros.		50 65
	O. J. Tolmie		85 50

ESTATE OF PETER CHOLICH.

1921.			
July 21.	To Probate	$	17 68
Sept. 7.	Deputy Minister of Finance		17 68
Oct. 11.	Patmore & Fulton		40 00
Oct. 13.	"Daily News"		8 50

ESTATE OF H. C. MEDCALF.

1921.			
Aug. 8.	To Williams, Manson & Gonzales	$	60 00
Sept. 6.	"Daily News"		8 50
Sept. 7.	Deputy Minister of Finance.		26 66
Sept. 8.	Registrar, certified copy of letter of administration.		1 00

CR.

ESTATE OF J. MATSUMOTO.

1921.			
Feb. 24.	By G.T.P., wages to Sept. 15th, 1920	$	28 73
	G.T.P., wages to Sept. 30th, 1920		63 40
	G.T.P., wages to Oct. 15th, 1920		13 54
	G.T.P., wages to Oct. 15th, balance		6 12

ESTATE OF H. R. DYKE.

1921.			
Mar. 2.	By Cash on body	$	204 00
	Premium on $20 U.S. currency		1 80
Oct. 4.	Bank of Montreal		1,546 23

ESTATE OF IDA M. RIDER.

1921.			
Mar. 21.	By Williams, Manson & Gonzales, sale of Lot 17, Blk. 9, Sec. 5, Prince Rupert.	$	582 78

ESTATE OF HENRY H. ROWE.

1921.			
Mar. 21.	By Williams, Manson & Gonzales, collected from C. O. Rowe	$	106 25
Mar. 26.	Ditto		29 75
Aug. 29.	Balance of account, New Norway		566 00

ESTATE OF JOSEPH LESKOSKI.

1921.			
Sept. 9.	By Royal Bank	$	314 41

ESTATE OF A. W. SCOTT.

1921.			
April 27.	By Sale of automobile	$	100 00
Oct. 20.	Bank of Commerce, savings account		364 36
	Bank of Commerce, current account		52 60

ESTATE OF KUSTI LANE.

1921.			
April 20.	By Constable Akroyd, balance of wages, Pacific Mills	$	140 70

ESTATE OF PETER CHOLICH.

1921.			
April 26.	By Cash	$	152 00
	Granby Co., wages		201 72

ESTATE OF JOHN ORD.

1921.			
June 20.	By Bank of Commerce	$	5 84

ESTATE OF H. C. MEDCALF.

1921.			
June 21.	By Williams, Manson & Gonzales, sale of deceased's interest in property, Prince Rupert	$	533 33
Sept. 12.	Williams, Manson & Gonzales, refund *re* advertising in "Daily News"		8 50

DR.

ESTATE OF A. C. GILLEN.

1921.			
July 30.	To B.C. Undertakers	$ 350	00
Sept. 6.	Williams, Manson & Gonzales	99	10
Sept. 7.	Deputy Minister of Finance.	62	12

ESTATE OF H. B. SKIRVIN.

1921.			
Aug. 12.	To B.C. Undertakers	$ 150	00
Aug. 16.	Pacific Cartage	1	50
Sept. 7.	W. N. M. Girling, transport of body to Prince Rupert	7	60
Sept. 6.	Probate	36	59
	Patmore & Fulton	35	65
Sept. 7.	Deputy Minister of Finance.	43	18
Sept. 8.	Registrar, two copies of letters of administration.	2	00
Sept. 9.	"Daily News"	8	50
Nov. 4.	Pacific Cartage	11	16
	Deputy Minister of Finance	6	31
Dec. 13.	Patmore & Fulton	26	70
	John Skirvin	669	07

ESTATE OF MARIA KAUFFMAN.

1921.			
Sept. 7.	To T. B. Hooper	$ 147	75
	News Printing & Publishing Co.	8	50
	Taxes, Lot 23–34–1, Prince Rupert	237	29
	Deputy Minister of Finance	75	43
Oct. 11.	Balance of taxes, Lot 23–34–1	19	37
	T. B. Hooper	125	00
Nov. 15.	Probate and succession duty	558	48
	Mrs. Hays	9	00
	Anna Hochstetter	163	96
	Clara Hochstetter	163	96

ESTATE OF AUGUST BRUNICH.

1921.			
Sept. 6.	To R. Cunningham & Sons, funeral expenses	$ 45	00
Dec. 20.	Official Administrator, Atlin	3	32

ESTATE OF ARTHUR BRISTOW.

1921.			
Sept. 6.	To W. J. Leary	$ 23	63
Sept. 7.	Deputy Minister of Finance, commission	12	70
Sept. 20.	Patmore & Fulton	36	60

ESTATE OF ALEX. L. FISHER.

1921.			
Oct. 20.	To B.C. Undertakers	$ 75	00
Sept. 9.	G.T.P. Telegraphs	2	15
Nov. 5.	Patmore & Fulton	30	00
	Minister of Finance, commission	13	84
	"Daily News"	8	50
Dec. 20.	Registrar, probate duty	2	76

ESTATE OF D. E. LACAILLE.

1921.			
Oct. 4.	To Dominion Government Telegraphs	$ 3	70

ESTATE OF MARTIN HANSON.

1921.			
Nov. 4.	To Pacific Cartage, cartage on trunk to Government Buildings	$ 1	00
Nov. 10.	Mrs. Embleton, room-rent, part payment	12	39
	Mrs. Embleton	5	61

ESTATE OF J. G. MELVIN.

1921.			
Nov. 21.	To William Haynor, funeral expenses	$ 51	05

CR.

ESTATE OF A. C. GILLEN.

1921.			
July 29.	By Cash on body	$1,242	40

ESTATE OF H. B. SKIRVIN.

1921.			
Aug. 12.	By Bank of Commerce	$ 861	61
Sept. 19.	Bank of Commerce, balance of account	2	00
Sept. 7.	Cash	8	45
Oct. 17.	Whalen Pulp & Paper Mills, wages	126	20

ESTATE OF WILLIAM BOOTH.

1921.			
Aug. 12.	By F. Morris, cash	$ 8	00

ESTATE OF MARIA KAUFFMAN.

1921.			
Aug. 20.	By Bank of Montreal	$1,505	24
	Bank of Montreal, balance..	3	50
Nov. 4.	David H. Hays & Co.	140	00

ESTATE OF W. A. TOWNELL.

1921.			
Aug. 30.	By Sale of shotgun	$ 15	00
Aug. 31.	Sale of revolver	8	00
Nov. 23.	Sale of camera	12	50
Dec. 8.	Sale of effects in cabin	30	45

ESTATE OF AUGUST BRUNICH.

1921.			
Aug. 20.	By Sunnyside Cannery, wages..	$ 48	32

ESTATE OF ARTHUR BRISTOW.

1921.			
Aug. 30.	By W. J. Leary, sale of cattle..	$ 254	01
Nov. 23.	Sale of farm tools	21	00

ESTATE OF ALEX. L. FISHER.

1921.			
Aug. 30.	By Surf Inlet Mines, tonnage bonus	$ 16	70
	Surf Inlet Mines, cash		50
	Surf Inlet Mines, cheques..	259	78

ESTATE OF D. E. LACAILLE.

1921.			
Sept. 27.	By Cash	$ 35	00

ESTATE OF MARTIN HANSON.

1921.			
Nov. 3.	By Patmore & Fulton, balance from E. McCroskrie	$ 13	39
Nov. 10.	Sale of trunk	18	00

ESTATE OF J. G. MELVIN.

1921.			
Nov. 14.	By Cash on body	$ 51	05

DR.

ESTATE OF LARS O. THUNE.

1921.			
Dec. 6.	To Patmore & Fulton	$	5 00
Dec. 28.	Registrar, additional probate		4 12
	Consul for Norway		375 06

ESTATE OF JAS. GRAHAM.

1921.			
Dec. 31.	To B.C. Undertakers, funeral..	$	75 00

ESTATE OF JOHN SMART.

1921.			
July 18.	To B.C. Undertakers	$	35 85

CR.

ESTATE OF LARS O. THUNE.

1921.			
June 22.	By National Trust Co., Edmonton	$	384 18

ESTATE OF JAS. GRAHAM.

1921.			
Dec. 14.	By Cash from Hospital	$	110 50

ESTATE OF T. KAWASAKI.

1921.			
Dec. 15.	By Sale of boat	$	300 00

ESTATE OF T. STANNIER.

1921.			
Dec. 16.	By Pacific Mills	$	24 04

ESTATE OF OLE J. JENSEN.

1921.			
Dec. 16.	By G. Little and E. Giggey	$	100 00
Dec. 29.	Bank of Montreal		299 65

ESTATE OF JOHN SMART.

1921.			
April 26.	By Sale of Victory bond	$	48 19

J. H. McMULLIN.
Official Administrator.

SOUTH OKANAGAN ELECTORAL DISTRICT.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1921, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF TEIJI SATO.

1921.			
Mar. 11.	To W. C. Kelley	$	20 95
Mar. 31.	W. C. Kelley, law costs		52 80
April 5.	Japanese Consul		503 39

ESTATE OF GEORGE RABY.

1921.			
Nov. 19.	To Ada Emma Craig	$	60 00
	Catharine M. Harvey		60 00
	Herbert E. Raby		60 00
Dec. 3.	R. H. English		25 00
	W. C. Kelley		50 00

ESTATE OF WM. GEORGE RABY.

1921.			
Mar. 22.	To The Standard Agencies, Ltd.	$1,076 60	
	McLeod, Robertson, Smith & Co., *re* Ryan		196 85
	George Campbell		700 00
July 19.	Provincial Treasurer, Alberta, succession duties		92 32
Feb. 25.	I. P. Barnes		15 00
April 12.	City of Calgary, taxes		169 60
Sept. 7.	Canada National Fire Insurance Co.		20 80
	Great West Permanent Loan Co.		183 40
Nov. 19.	Ada Emma Craig		150 00
	Catharine M. Harvey		150 00
	Herbert E. Raby		150 00
Dec. 3.	W. C. Kelley		568 20

ESTATE OF RALPH BERNAL CRAWLEY.

1921.			
June 18.	To W. C. Kelley	$	35 99
	Dr. E. W. Sawyer		346 05
	E. S. Crawley		65 45
	Andrew de Barss		70 51

CR.

ESTATE OF TEIJI SATO.

1921.			
Jan. 7.	By Coupons of bonds	$	11 00
Mar. 11.	Waghorn, Gwynne & Co., bonds		396 98

ESTATE OF WM. GEORGE RABY.

1921.			
Mar. 14.	By Canada N. Fire Insurance Co.	$	60 00

ESTATE OF RALPH BERNAL CRAWLEY.

1921.			
June 18.	By Okanagan College claim	$	518 00

Dr.				Cr.			
ESTATE OF GEORGE ROBERTS.				**ESTATE OF GEORGE ROBERTS.**			
1921.				1921.			
June 18.	To W. H. Thacker	$	54 00	June 18.	By Faulkner & Thacker	$	82 85
	E. C. Graham		5 00		Draft, Bank of Montreal, Kelowna, B.C.		381 52
	J. B. Whitehead		10 00	Nov. 15.	Waghorn, Gwynne & Co., bonds		526 78
	C. I. Last		9 50				
	Kelowna Furniture Co.		125 00				
	Tax-collector, Morrell		7 56				
	W. C. Kelley		23 22				
	St. Michael's and All Angels		5 00				
Sept. 7.	Tax-collector, Morrell		4 50				
Nov. 15.	Vernon Granite and Marble Co.		165 00				

W. C. KELLEY,
Official Administrator.

COUNTY OF VANCOUVER.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1921, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

Dr.				Cr.			
ESTATE OF ISRAEL ATWELL.							
1921.							
Jan. 11.	To Commission	$	24 35				
	Mary Atwell		675 53				
ESTATE OF CONTESOTTO ANGELO.							
1921.							
Feb. 11.	To Probate duty	$	19 34				
	Sundries		1 20				
	Italian Consul		1,071 71				
ESTATE OF HERMAN ANDRICIUS.							
1921.							
Feb. 2.	To M. A. Macdonald	$	53 15				
	"Daily Sun"		3 00				
	Sisters of St. Ann		337 95				
	Hall & O'Halloran		21 30				
	Commission		53 02				
	Sundries		1 52				
	Sisters of St. Ann		220 00				
ESTATE OF SAM ART.				**ESTATE OF SAM ART.**			
1921.				1921.			
June 1.	To Abbott, McRae & Co.	$	13 00	May 4.	By Cash	$	30 25
	Sundries		1 86				
ESTATE OF JOSEPH O. ARSENAULT.				**ESTATE OF JOSEPH O. ARSENAULT.**			
1921.				1921.			
April 1.	To Commission	$	198 03	Feb. 24.	By Cash and effects	$	45 00
	T. Edwards Co.		849 60		Bank of Montreal		3,916 19
	"The World"		10 35				
	Farris & Emerson		54 95				
	Sundries		1 75				
July 15.	Eleanor Babineau		500 00				
ESTATE OF MOSES D. AUSTIN.				**ESTATE OF MOSES D. AUSTIN.**			
1921.				1921.			
June 1.	To Joseph Oliver	$	20 90	April 5.	By Cash and effects	$	14 53
	Nunn & Thomson		89 15		Union Bank		102 83
	Commission		5 87				
	Sundries		1 35				
1921. **ESTATE OF ELIZABETH ANDERSON.**							
June 24.	To Florence Prentice	$	43 99				
	Martha Wilson		43 99				
	Margaret Craig		87 96				
	Joshua Prentice		43 99				
	William Anderson		219 92				
1921. **ESTATE OF WILLIAM J. ANDREW.**				1921. **ESTATE OF WILLIAM J. ANDREW.**			
June 1.	To MacInnes & Arnold	$	56 70	May 13.	By Molsons Bank	$	1,160 10
	St. Paul's Hospital		29 00		Life insurance		895 57
	Center & Hanna		125 50				
	Canadian Financiers, Ltd.		45 50				
	Commission		58 00				
	Dr. C. W. Proud		15 00				
	"The World"		6 90				
	Clothing for widow		150 00				
	Dr. F. H. Trousdale		50 00				
	Taxes, Lot 23 of S.W. ¼ 60		5 75				
	W. J. Andrew & Gray		34 79				
	Commission		44 78				
Oct. 7.	Public Hospital for Insane		500 00				
	Sundries		2 75				

DR.

ESTATE OF E. ANDREWS.

1921.			
July 4.	To Commission	$ 2	95
	Edwards & Bell	50	00
	Sundries		35

ESTATE OF JOSEPH J. ANDISON.

1921.			
Dec. 2.	To Probate duty	$ 10	75
	G. R. Long	51	20
	Commission	54	40
	"The World"	14	26
	Sundries	1	50

ESTATE OF ELIZABETH ANDISON.

1921.			
Dec. 2.	To Probate duty	$ 7	25
	G. R. Long	35	00
	Commission	35	19
	"Daily World"	7	36
	Sundries	1	50

ESTATE OF JULIA H. BELL.

1921.			
Jan. 7.	To General Hospital	$ 46	25
	Commission	31	25
	Elen M. Robson	500	00

ESTATE OF PETER BRESSER.

1921.			
Feb. 18.	To A. Hewlett	$ 32	00
Oct. 10.	Taxes on property	45	38
	Beatrice H. Bresser	17	50

ESTATE OF FRED BATTS.

1921.			
June 23.	To Mrs. F. H. Batts	$ 456	75

ESTATE OF JAMES BROWN.

1921.			
Jan. 11.	To Commission	$ 13	75
	Agnes Brown	582	50
	Taxes on land	139	50

ESTATE OF AUGUSTUS BELL.

1921.			
Dec. 17.	To Probate duty	$ 28	94
	Margaret Stewart	257	10
	Mary C. Bell	257	10
	Zita J. Bell	257	10
	Charles Bell	257	10
	Edward Bell	257	10

ESTATE OF WILHELMINA BOSSI.

1921.			
Jan.	To "Daily Sun"	$ 6	00
	Commission	42	52
	Davis & Co.	58	60
	Sundries	2	50

ESTATE OF ARTHUR L. BELL.

1921.			
April 4.	To Commission	$ 15	90
May 16.	Cyrus N. Bell	302	15

ESTATE OF DAN BASS.

1921.			
Mar. 3.	To Joseph Oliver	$ 24	40
	"Daily Sun"	6	00
	St. Patrick's Church	11	00
	T. J. Kearney & Co.	154	50
	General Hospital	45	55
	Commission	20	03
	Sundries	2	50

ESTATE OF AGNES BROWN.

1921.			
April 4.	To Commission	$ 32	87
	McTaggart & Ellis	43	40
	Sundries		50
	"The World"	10	35

ESTATE OF MAMIE BURNS.

1921.			
April 4.	To Commission	$ 154	85
	"Daily World"	19	55
	J. Oliver	68	90
	Probate duty	141	69
	Succession duty	269	22
May 26.	May Remington	1,200	00
	Dr. McKee	5	00
	Sundries	1	50
July 12.	May Remington	1,236	27

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ESTATE OF E. ANDREWS.

1921.			
July 4.	By Cash and effects	$ 59	15

ESTATE OF JOSEPH J. ANDISON.

1921.			
Nov. 10.	By Cash	$ 5	60
	Bank of Commerce	573	84
	Britannia Stones	8	52
	Interest on bond	6	57

ESTATE OF ELIZABETH ANDISON.

1921.			
Nov. 29.	By Bank of Commerce	$ 573	83

ESTATE OF JAMES BROWN.

1921.			
May 25.	By Payments on house	$ 250	00

ESTATE OF ARTHUR L. BELL.

1921.			
Mar. 7.	By Effects	$ 289	65

ESTATE OF DAN BASS.

1921.			
Feb. 7.	By Royal Bank	$ 340	87
	Casualty Co.	59	75

ESTATE OF AGNES BROWN.

1921.			
Mar. 4.	By Remittances to Treasury Department	$ 37	50
April 4.	Remittances to Treasury Department	620	00
June 2.	Remittances to Treasury Department	25	00
Sept. 9.	Remittances to Treasury Department	37	50
Nov. 8.	Remittances to Treasury Department	12	50

ESTATE OF MAMIE BURNS.

1921.			
Mar. 31.	By Royal Bank	$3,096	98

DR.

ESTATE OF ALEXANDER BURTON.

1921.		
June 2. To Commission	$	3 52
Sundries		35

ESTATE OF JIM BOSHKI.

1921.		
Aug. 9. To Commission	$	0 95
Sundries		2 85

ESTATE OF MICHAEL J. BESNER.

1921.		
Oct. 7. To Commission	$	2 44
Sundries		50
L. C. Wiseman		20 00

ESTATE OF JAMES BURT.

1921.		
July 4. To MacDonald & Prenter	$	56 80
Thomas Ley		100 00
T. J. Kearney & Co.		203 50
Canadian Financiers Co.		45 50
Dr. Gillies		35 00
Commission		254 34
Sundries		5 80

ESTATE OF WILLIAM CRAWFORD.

1921.		
Feb. 7. To Commission	$	26 31
June 2. Commission		18 11
Taxes, Lot 1, Blk. 87, D.L. 549		39 85

ESTATE OF THOMAS D. CUMMING.

1921.		
Aug. 25. To Taxes, Lot 23, Blk. 25, D.L. 11	$	29 80

ESTATE OF MATTHEW CURRY.

1921.		
Jan. 29. To Water	$	5 10
Repairs to house		23 95
Commission		270 98
Sundries		2 50
Nellie Jester		1,493 65
Philip Curry		1,493 65
Mary A. Hughes		1,493 65
George Curry		373 42
Ethel Harrison		373 41
Margaret Quinn		373 41
Bernard Curry		373 41

ESTATE OF JAMES CRANSTON.

1921.		
June 1. To J. Oliver	$	20 20
Commission		4 93
Sundries		1 50

ESTATE OF GIOVANNI CAMICIA.

1921.		
Feb. 7. To Repairs to house	$	21 30
Water		16 50
Commission		24 30
Taxes		371 25

ESTATE OF ISABELLA CARGILL.

1921.		
May 4. To Taxes	$	13 63

ESTATE OF ALMINA E. CARSCALLEN.

1921.		
Feb. 8. To Black & Bush	$	59 30

ESTATE OF ROBERT CAMERON.

1921.		
Jan. 11. To Commission	$	4 87
Alex. Cameron		500 00
Daniel Cameron		240 75
R. A. Breckenridge		251 50
W. S. Middelboro		2,289 57

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ESTATE OF ALEXANDER BURTON.

1921.		
May 11. By Cash and effects	$	70 35

ESTATE OF JIM BOSHKI.

1921.		
July 30. By Wages	$	19 24

ESTATE OF MICHAEL J. BESNER.

1921.		
Oct. 3. By Wages	$	48 87

ESTATE OF JAMES BURT.

1921.		
May 27. By Cash	$	128 50
Furniture and effects		215 80
Lots 10 and 11, Blk. 227, D.L. 526		1,576 45
Bank of Montreal		1,627 99
Jewellery		70 00
War bonds		982 28
"		486 30

ESTATE OF THOMAS BOURKE.

1921.		
Oct. 10. By Effects	$	14 00

ESTATE OF EMMA D. BIBLE.

1921.		
Dec. 31. By Union Bank	$	863 39
Interest on bonds		33 00
Rent		20 00

ESTATE OF WILLIAM CRAWFORD.

1921.		
Jan. 19. By Lot 3, Blk. 87, D.L. 549	$	526 25
May 6. Lot 6, Blk. 87, D.L. 549		362 25

ESTATE OF THOMAS D. CUMMING.

1921.		
Feb. By Rent	$	18 40

ESTATE OF MATTHEW CURRY.

1921.		
Jan. 3. By Rent	$	105 00
April 5. Lot 37, Blk. 40, D.L. 541		5,244 55

ESTATE OF JAMES CRANSTON.

1921.		
May 4. By Dividend	$	94 13

ESTATE OF GIOVANNI CAMICIA.

1921.		
Jan. 7. By Rents	$	503 00

DR.

ESTATE OF JAMES J. COLLETT.

1921.			
Jan. 11.	To Redeeming jewellery	$	31 25
	Jean Bucknell		129 00
	T. M. Trevethic		10 00
	Commission		2 87
	Probate duty		2 02
	Sundries		1 20

ESTATE OF CHARLES CALIS.

1921.			
Jan. 7.	To "Daily Province"	$	11 05
	Moore & Wyness		69 75
	Probate duty		14 73
	St. Patrick's Church		15 00
	E. de Vliegler		101 67
	J. D. Craig		500 00
	Helena Calis		1,019 40
	Marie de Vlieger		1,019 40
	Commission		145 99
	Sundries		3 50

ESTATE OF JAMES L. COLLINS.

1921.			
Jan. 7.	To Canadian Financiers Co.	$	25 50
	Dr. Champion		14 00
	Dr. Carruthers		50 00
	H. D. Hulme		57 75
	Harron Bros.		148 00
	"The World"		18 70
	Probate duty		15 86
	John Collins, Sr.		3,033 82
	Commission		242 77
	Sundries		3 95

ESTATE OF THOMAS CUSHNIR.

1921.			
Jan. 7.	To "The World"	$	4 40
	H. B. Robinson		41 10
	Nick Budzy		32 00
	Probate duty		2 90
	Commission		14 65
	Sundries		35

ESTATE OF EUGENE COCHIRY.

1921.			
Feb. 2.	To T. J. Kearney & Co.	$	114 00
	Commission		6 48
	Sundries		35

ESTATE OF WILLIAM CROSS.

1921.			
June 1.	To "Daily Sun"	$	9 60
	J. Oliver		27 05
	Dr. J. M. Pearson		125 00
	Edwards & Bell		73 00
	Commission		21 90
	Sundries		1 50

ESTATE OF ANNA W. CAMPBELL.

1921.			
	To Telephone and light	$	7 12
	A. F. Lauder		60 00
	Fleishmann & Co.		130 45
	J. S. Rankin		10 00
	Commission		21 60
	Dr. MacDermot		25 50
	Mount Pleasant Undertakers		273 00
	Sundries		10 16

ESTATE OF JOHN DOSKOCH.

1921.			
June 2.	To Commission	$	4 00

ESTATE OF VALENTINO DAPOTO.

1921.			
May 2.	To Court order copy	$	1 00
	Taxes, 16-9-¼ D.L. 622		3 88
	Taxes, Lot 20/23/182 B.		61 89

ESTATE OF JABEZ D. DE WITT.

1921.			
Jan. 7.	To Water	$	14 40
	Interest on mortgage		28 00
	Mrs. E. Mills		900 00
	Farris, Emerson & Stultz		375 00
	McTaggart & Ellis		151 10
	Taxes, Lot 7, Sub. 3, Sub. 5, Blk. 9		16 20
	Commission		75 60
	Sundries		9 70

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ESTATE OF JAMES J. COLLETT.

1921.			
Mar. 19.	By Effects	$	62 50

ESTATE OF CHARLES CALIS.

1921.			
Jan. 21.	By Royal Bank	$	622 05
	Lot 16, N.E. ¼ Sec. 16, Tp. 12		1,665 00

ESTATE OF JAMES L. COLLINS.

1921.			
Jan. 5.	By Cash	$	13 85
	Bank of Commerce		1,804 83
April 23.	Washington Savings Bank		3,033 82

ESTATE OF THOMAS CUSHNIR.

1921.			
Jan. 3.	By Time-cheques	$	293 08

ESTATE OF EUGENE COCHIRY.

1921.			
Jan. 8.	By Cash	$	129 65

ESTATE OF WILLIAM CROSS.

1921.			
April 11.	By Cash	$	9 50
	Bank of Montreal		428 50

ESTATE OF ANNA W. CAMPBELL.

1921.			
Aug. 8.	By Cash	$	38 00
	Furniture and effects		389 00
	Metropolitan Life Co.		434 79
	Rent		5 00

ESTATE OF JOHN DOSKOCH.

1921.			
May 26.	By G. Doskoch	$	80 00

ESTATE OF JABEZ D. DE WITT.

1921.			
Jan. 26.	By Watch	$	4 50
	Rent		180 00
	Lot 12, Blk. 216, D.L. 526.		887 39
	W. ½ Lot 5/312/526		379 69

DR.

ESTATE OF CHARLES DAVISON.

1921.			
Aug. 9.	To Commission	$ 5	13
	Sundries		40

ESTATE OF GEORGE DYKER.

1921.			
Aug. 23.	To Taxes, E. ½ Lot 862, Hastings	$ 61	40

ESTATE OF W. A. DOUGAN.

1921.			
Feb. 3.	To Pilkingron Bros.	$ 12	65
	Taxes, Lot 8 of 2, S.E. ¼ Sec. 40	3	55

ESTATE OF JAMES DOBIE.

1921.			
Oct. 7.	To Commission	$ 76	90
	"Daily Province"	5	05
	Wilson, Whealler & Symes	102	00
	James C. Clark	1,352	50
	Sundries	1	50

ESTATE OF ROSE E. DAY.

1921.			
Dec. 2.	To Dr. T. H. Agnew	$ 15	00
	Clothing for infants	20	00
	T. George	15	00
	J. MacCormack	37	00
	General Hospital	19	00
	Center & Hanna	52	00
	J. Oliver	27	40
	"Daily Province"	5	05
	J. E. Snook	36	53
	Commission	16	80
	Redeeming jewellery	11	10
	Ambulance	5	00
	Sundries	1	50

ESTATE OF REGINALD T. EAGER.

1921.			
Jan. 29.	To Water	$ 10	20
	Taxes	409	56
	Registry fee	15	30
	Isabell Eager (widow)	200	00
	Commission	56	06

ESTATE OF ANNIE ELMES.

1921.			
Oct. 7.	To Ambulance	$ 5	00
	Nunn & Thomson	209	00
	Farris, Emerson & Stultz	25	00
	"Daily World"	14	26
	Commission	21	69
	Probate duty	1	84
	Dr. T. W. Brydon-Jack	10	00
	Sundries	1	20

ESTATE OF JUSTUS ENGBLUM.

1921.			
Nov. 4.	To Commission	$ 97	22
	McTaggart & Ellis	40	15
	Harron Bros.	149	00
	Dr. A. B. Shinbein	150	00
	Dr. A. Cumming	50	00
	General Hospital	192	95
	Sundries	1	50

ESTATE OF THOMAS C. EDWARDS.

1921.			
Nov. 4.	To Commission	$ 28	40
	Taxes	27	80
	Commission on land value	266	25
	Wilson, Whealler & Symes	174	50
	"Daily Province"	14	25
	Sundries	1	50
	Ida Edwards	55	45

ESTATE OF J. EMMOTT.

1921.			
	To Commission	$ 2	00

CR.

ESTATE OF CHARLES DAVISON.

1921.			
July 8.	By Cash	$ 102	66
	Watch	4	00

ESTATE OF JAMES DOBIE.

1921.			
Oct. 4.	By Bank of Montreal	$1,537	95

ESTATE OF ROSE E. DAY.

1921.			
Nov. 17.	By Furniture and effects	$ 38	00
	Prudential Insurance Co.	298	02

ESTATE OF GIOSEPPE DIPAOLI.

1921.			
Dec. 29.	By Cash	$ 141	33

ESTATE OF REGINALD T. EAGER.

1921.			
Jan. 2.	By Rents	$ 360	00
Sept. 3.	Lot 8, Blk. 21, D.L. 540	207	65
Oct. 29.	" "	473	60

ESTATE OF ANNIE ELMES.

1921.			
Oct. 4.	By Bank of Montreal	$ 354	65
	Bond	49	18

ESTATE OF JUSTUS ENGBLUM.

1921.			
Oct. 13.	By Royal Bank	$1,944	38

ESTATE OF THOMAS C. EDWARDS.

1921.			
Oct. 14.	By Dow-Fraser Trust Co.	$ 568	15

ESTATE OF WALTER J. FRAME.

1921.			
Jan. 29.	By Clearing land	$ 25	00
May 2.	"	20	00

ESTATE OF J. EMMOTT.

1921.			
Nov. 29.	By Wages	$ 56	24

DR.

ESTATE OF EDWARD P. FELLOWS.

1921.			
	To Shipping charges, freight and cartage	$	7 40
	"Daily Province"		14 90
	Fire insurance		120 00
	Probate duty		40 60
	Succession duty		292 32
	Water		36 00
	Repairs to house		154 50
	Taxes, B. 12/14, D.L. 630.		178 00
	Sidney Marshall		45 00
	Sundries		4 15

ESTATE OF ROBERT FLETCHER.

1921.			
Feb. 7.	To Commission	$	92
	Mary D. Fletcher		17 50

ESTATE OF ISABELLA FORSYTH.

1921.			
Oct. 3.	To Commission	$	3 88
	Mount Pleasant Undertakers		73 69

ESTATE OF J. W. FARRINGTON.

1921.			
Dec. 2.	To Commission	$	2 80
	Thomas Farrington		53 29

ESTATE OF O. FIVA.

1921.			
Dec. 2.	To Commission	$	1 33

ESTATE OF ANDREW GROVAN.

1921.			
May 2.	To Commission	$	2 00
	Anna Hjildness		19 27
	J. K. Kallem		19 26

ESTATE OF MICHAEL GREEN.

1921.			
Feb. 8.	To M. A. Macdonald	$	14 90
	C. Kennedy		15 00
	T. J. Kearney & Co.		160 50
	Commission		175 05
	Taxes, Lots 35, 36, 9, 10, D.L. 264A		194 72
	Abbott, Macrae & Co.		120 40
	St. Paul's Hospital		215 50
	Probate duty		74 58
	Succession duty		356 09
	Taxes, 9, 10, 158, 264A		462 54
Mar. 18.	Taxes, 35, 36, 158, 264A		186 05
	"Daily Sun"		13 20
	Dr. F. K. McPhillips		300 00
	Abbott, Macrae & Co.		12 85
	James Green		500 00
	Eliza Powers		500 00
	Sundries		8 75

ESTATE OF JOSEPH GILBERT.

1921.			
July 4.	To Commission	$	6 15
	Sundries		35

ESTATE OF ESTHER GRIFFITH.

1921.			
Aug. 5.	To St. Paul's Hospital	$	11 00
	Mary Service		29 00
	Eva Reeves		63 23
	Nunn & Thomson		127 00
	T. Mathews		40 00
	J. Oliver		31 40
	Commission		96 32
	Dr. C. W. Prowd		25 00
	Dr. W. C. McKechnie		25 00
	"The World"		10 35
	Sundries		11 55

ESTATE OF ERNEST GABHARDT.

1921			
Dec. 2.	To Probate duty	$	0 69
	Ellis & Brown		22 00

ESTATE OF FRANK E. GLANVILLE.

1921.			
Nov. 4.	To Commission	$	36 30
	"The World"		7 36
	McTaggart & Ellis		35 70
	Nunn & Thomson		165 00
	B. L. Wood		10 00
	General Hospital		50 20
	Dr. W. D. Patton		47 00
	Sundries		2 75

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ESTATE OF EDWARD P. FELLOWS.

1921.			
Jan. 10.	By Effects	$	17 00
	McTaggart & Ellis		28 21
	Lincoln Safe Deposit Co.		9 31
	Bank of Montreal		496 61
	Rent		427 95

ESTATE OF ROBERT FLETCHER.

1921.			
Jan. 18.	By Cash	$	18 42

ESTATE OF ISABELLA FORSYTH.

1921.			
Oct. 3.	By Draft	$	77 57

ESTATE OF J. W. FARRINGTON.

1921.			
Nov. 29.	By Wages	$	56 09

ESTATE OF O. FIVA.

1921.			
Nov. 29.	By Wages	$	26 65
	Watch		1 00

ESTATE OF ANDREW GROVAN.

1921.			
April 7.	By Cash	$	40 53

ESTATE OF MICHAEL GREEN.

1921.			
Mar. 2.	By Bank of Montreal	$3,460 05	
	Refund of duty		74 87

ESTATE OF JOSEPH GILBERT.

1921.			
June 25.	By Cash	$	123 03

ESTATE OF ESTHER GRIFFITH.

1921.			
July 12.	By Dividend	$	25 42
	Household furniture, etc.		260 95
	Imperial Bank		504 95
	C.P.R. shares		1,135 31

ESTATE OF ERNEST GABHARDT.

1921.			
Oct. 8.	By Effects	$	34 20
	Rent		22 25

ESTATE OF FRANK E. GLANVILLE.

1921.			
Oct. 8.	By Cash	$	82 90
	Bank of Montreal		663 35

DR.

ESTATE OF BASIL T. GORMAN.

1921.			
Dec. 2.	To Commission	$	6 98
	Probate duty		5 09
	Sundries		50

ESTATE OF JUSTUS W. HOWISON.

1921.			
April 29.	To Taxes, Lots 5, 6, Blk. 18/187	$	16 50
	Taxes, Lots 5, 6, Blk. 3/48..		10 00

ESTATE OF ANGEL HEVIA.

1921.			
May 2.	To Hospital	$	10 00
	Dr. Newcombe		11 00
	W. J. Robertson		4 00
	Harron Bros.		16 00
	Commission		7 00
	Sundries		2 50

ESTATE OF LILIAN HORNE.

1921.			
Jan. 7.	To "The World"	$	18 70
	Dr. Riggs		5 00
	Dr. Parry		25 00
	Dr. Farish		25 00
	Dr. Burnett		55 00
	General Hospital		55 25
	Probate duty		23 61
	Commission		123 14
	Darline & Noble		133 40
	Mount Pleasant Undertaking Co.		128 00
	Sundries		1 75

ESTATE OF THOMAS HEWARD.

1921.			
Feb. 7.	To Commission	$	3 38
	H. Heward		64 36

ESTATE OF WILLIAM J. HARRIS.

1921.			
Aug. 9.	To Commission	$	1 80
	Sundries		35

ESTATE OF AKUTARO HIRAI.

1921.			
Sept. 3.	To J. Oliver	$	28 15
	"Daily Province"		13 65
	T. W. Jeffs		3 00
	Commission		44 55
	Sundries		1 50
	Kunisana Yoshida		798 95

ESTATE OF JOHN E. V. ISAAC.

1921.			
May 2.	To Dr. G. M. Fraser	$	284 25
	Bank of Montreal		3,377 81
	Commission		192 73

ESTATE OF ANTHONY J. JOHNSON.

1921.			
Jan. 11.	To Commission	$	6 81
	Sundries		1 35
	Julia J. Johnson		86 51

ESTATE OF JOHN R. JOHANSON.

1921.			
Mar. 3.	To J. Oliver	$	20 75
	Commission		5 50
	General Hospital		3 66
	"Daily Sun"		2 80
	Mount Pleasant Undertakers		75 00
	Sundries		2 20

ESTATE OF JALMARI KOSKI.

1921.			
June 2.	To A. Manelins	$	168 19
	Sundries		3 21

ESTATE OF WILLARD V. KENNEDY.

1921.			
June 20.	To D. C. Kennedy	$	117 00

ESTATE OF ANDREW KIRKLAND.

1921.			
June 18.	To A. Kirkland	$	190 00
	Commission		10 00

CR.

ESTATE OF BASIL T. GORMAN.

1921.			
Nov. 25.	By Cash	$	139 58

ESTATE OF ANGEL HEVIA.

1921.			
May 2.	By Lot 2/18/549	$	140 19

ESTATE OF THOMAS HEWARD.

1921.			
Jan. 10.	By Powell River Co.	$	67 74

ESTATE OF WILLIAM J. HARRIS.

1921.			
May 11.	By Cash	$	8 90
	Effects		27 00

ESTATE OF JAMES HUSBAND.

1921.			
July 4.	By Effects	$	1 50

ESTATE OF AKUTARO HIRAI.

1921.			
Aug. 20.	By New York Life Insurance Co.	$	891 00

ESTATE OF JOHN E. V. ISAAC.

1921.			
April 25.	By N. 134 ac. D.L. 133.	$	3,854 79

ESTATE OF JOHN R. JOHANSON.

1921.			
Feb. 25.	By Bank of Commerce	$	109 91

ESTATE OF JALMARI KOSKI.

1921.			
Jan. 26.	By Watch	$	3 00
	Wages		6 15

ESTATE OF ANDREW KIRKLAND.

1921.			
Mar. 7.	By Lot 6, Blk. 23, D.L. 95	$	200 00

DR.

ESTATE OF JOHN KENNEY.

1921.		
Oct. 7. To Bowser, Reid & Wallbridge.	$	37 00
"The World"		28 06
J. H. Harford		65 95

ESTATE OF GUSTAV A. KARZONINKAT.

1921.		
To Taxes, Lots 11, 12/1, Sec. 1	$	3 20
Taxes, Lots 10/1064/526		14 28

ESTATE OF JOHN A. KENNAN.

1921.		
Aug. 12. To H. O. Alexander	$2,500	00

ESTATE OF LAL SINGH.

1921.		
To Ishar Singh	$	599 39
Commission		124 30

ESTATE OF LAM SINGH.

1921.		
April 14. To Consul for China	$1,018	06

ESTATE OF STEPHEN LANGAR.

1921.		
Jan. 7. To Wilson & Jamieson	$	31 20
"Daily Sun"		20 40

ESTATE OF DANIEL LONG.

1921.		
Feb. 18. To Campbell & Singer	$	23 56
George Long		180 00
Isabell Vine		80 00
E. Estall		180 00
W. N. Miller		180 00
Taxes, Lots 1, 2/178A/526		42 00
M. Wadden		90 00

ESTATE OF HARRY LEES.

1921.		
Jan. 7. To Powell River Co.	$	30 49
J. Oliver		32 25
Commission		27 58
Sundries		2 00
M. E. Morley		449 78

ESTATE OF LEE KIM.

1921.		
May 2. To T. Edwards Co.	$	273 50
"Daily Province"		12 40
Farris & Emerson		34 40
Commission		58 29
Sundries		1 50

ESTATE OF JOHN LUCY.

1921.		
May 2. To McTaggart & Ellis	$	44 40
T. Edwards Co.		401 65
Commission		45 43
Royal Bank		17 82
G. B. Burney		30 00
"Daily Sun"		15 95
Dr. McIntosh		75 00
W. H. Malkin & Co.		31 08
Killing caterpillars		5 00
Dr. Gillies & Gillies		20 00
Sundries		2 75

ESTATE OF LEW CHONG LEE.

1921.		
Aug. 5. To "Daily Province"	$	2 65
Yarwood & Durrant		23 80
Commission		10 74
Sundries		1 40

ESTATE OF SARAH M. LEACH.

1921.		
Sept. 3. To Davis & Co.	$	43 65
Commission		38 42
Sundries		35
Davis & Co.		686 05

1921. ESTATE OF PETER I. MOORE.

Jan. 29. To Water	$	3 15
Taxes		246 95
Valuation fee and drawing agreements		10 00
McTaggart & Ellis		58 95
Commission		98 76
Probate and succession duty		285 42
Dr. T. V. Curtin		86 50

CR.

ESTATE OF LAL SINGH.

1921.		
Nov. 11. By Western Hemlock Mills	$2,486	24

ESTATE OF HARRY LEES.

1921.		
Jan. 10. By Effects	$	9 50

ESTATE OF LEE KIM.

1921.		
April 9. By Cash	$	65 00
Bank of Commerce		1,100 77

ESTATE OF JOHN LUCY.

1921.		
April 6. By Cash	$	1 00
Household effects		163 80
Bank of Montreal		725 92
Royal Bank		17 82

ESTATE OF LEW CHONG LEE.

1921.		
July 18. By Bank of Commerce	$	214 78

ESTATE OF SARAH M. LEACH.

1921.		
Aug. 19. By Bank of Montreal	$	768 47

1921. ESTATE OF JOHN B. LOCKWOOD.

Dec. 13. By Cash	$	49 07

1921. ESTATE OF PETER I. MOORE.

April 7. By Lots 1, 2/6/302	$	942 80
Rent		60 00

DR.

ESTATE OF CHARLES S. MANBY.

1921.			
April 22.	To Allan Manby	$	87 35
	Ethel Manby		87 35
	Herbert Manby		87 35
	Maude Manby		87 35
	M. Jane Manby		87 35
Aug. 19.	Allan Manby		87 35

ESTATE OF ERNEST A. MORGAN.

1921.			
Oct. 18.	To Ben Morgan	$	737 79

ESTATE OF LEWIS MARTIN.

1921.			
Mar. 7.	To Patterson, Chandler & Co...	$	96 80
	Neil Martin		290 00
	Malcolm Martin		290 00
	Johanna Martin		290 00
	Mary A. Martin		290 00
	A. McDonald		290 00
	Taxes, Lots 29, 30, Blk. 9, D/L. 171		18 00

ESTATE OF MIKE MARTIN.

1921.			
Feb. 3.	To Canadian Financiers Trust Co.	$	45 50
	St. Paul's Hospital		25 25
	Dr. H. R. Stors		50 00
	M. A. Macdonald		53 50
	T. J. Kearney & Co.		179 00
	"Daily Province"		19 80
	Commission		105 60
	Sundries		2 25

ESTATE OF NELS MARTINSON.

1921			
Jan. 7.	T. McTaggart & Ellis	$	23 05
	T. Edwards Co.		130 00
	"Daily Sun"		6 00
	Commission		17 38
	Sundries		1 50

ESTATE OF GILBERT S. MAITLAND.

1921.			
Jan. 7.	To M. Riksman	$	38 00
	Sointula Co.		17 95
	Commission		19 87
	Farris & Emerson		8 20
	H. Halkoner		312 84
	Sundries		50

ESTATE OF MICHAEL MURPHY.

1921.			
Mar. 3.	To General Hospital	$	22 78
	"The World"		10 80
	Probate duty		38 10
	Nora Murphy		363 00
	Commission		44 60
	Taxes, Lot 2091		32 30
	Patrick Rogers		236 91
	Sundries		2 25
	Bowser, Reid & Wallbridge		90 00

1921. ESTATE OF GEORGE B. MACAULAY.

Feb. 7.	To Commission	$	22 77
	Whiteside, Darling & Hogg		11 55
	Sundries		50
	E. S. Macaulay		420 50

1921. ESTATE OF JOHN MURPHY.

May 2.	To Commission	$	1 25
	Sundries		75
	Nunn & Thomson		23 50

1921. ESTATE OF JOHN MARTIN.

May 2.	To Dr. Vrooman	$	15 00
	Dr. Pearson		15 00
	Nunn & Thomson		150 00
	Commission		19 90
	Ellis & Brown		27 30
	Sundries		50

1921. ESTATE OF JOHN MADSEN.

July 4.	To Commission	$	23 42
	"The World"		8 00
	Probate duty		9 88
	Bayfield & Harvey		92 16
	Armstrong & Hotson		183 50
	Dr. Pearson		40 00
	J. F. Smith		5 60
	Sundries		50
	General Hospital		40 40

CR.

ESTATE OF LEWIS MARTIN.

1921.			
April 19.	By Compensation Board	$	73 00

ESTATE OF MIKE MARTIN.

1921.			
Jan. 4.	By Bank of Montreal	$	949 88
	Interest		95 60
	Payment on mortgage		1,070 00

ESTATE OF NELS MARTINSON.

1921.			
Jan. 14.	By Royal Bank	$	800 75

ESTATE OF MICHAEL MURPHY.

1921.			
Jan. 21.	By Effects	$	0 50
	Royal Bank		891 52

1921. ESTATE OF GEORGE B. MACAULAY.

Jan. 22.	By Bank of Montreal	$	452 32
	Effects		3 00

1921. ESTATE OF JOHN MURPHY.

April 1.	By Cash	$	2 50
	Effects		23 00

1921. ESTATE OF JOHN MARTIN.

May 2.	By Cash	$	398 00

1921. ESTATE OF JOHN MADSEN.

June 9.	By Standard Bank	$	468 41

DR.

ESTATE OF KIYOSHI MURATA.

1921.			
Aug. 10.	To Hansuki Tanaka	$	45 00
	Shosuka Nakano		25 00
	Farris, Emerson & Stultz		47 40
	"The World"		20 70
	Commission		97 35
	Nisabura Aoki		250 00
	Sundries		1 50

ESTATE OF ELLEN MCCANN.

1921.			
May 22.	To Commission	$	21 03
	Bridget McCann		451 95

ESTATE OF MALCOLM MACKAY.

1921.			
May 2.	To T. Edwards Co.	$	118 01
	Sundries		1 20

ESTATE OF WILLIAM J. MACPHERSON.

1921.			
Feb. 25.	To "Daily Sun"	$	9 00
	J. Oliver		25 90
	Commission		29 85
	Edwards & Bell		210 73
	Sundries		1 50

ESTATE OF DANIEL MCSHERRY.

1921.			
Feb. 3.	To Probate duty	$	16 65
	Nunn & Thomson		20 00
	H. S. Cranswick		47 64
	Commission		85 21
	"Daily Sun"		15 00
	R. H. Whidden		165 40
	Isabella Lyons		250 00
	Bird & MacDonald		53 40
	Taxes, Lot 40		15 73
	National Trust Co.		40 00
	Grisbach, O'Connor & Co.		4 72
	Sundries		3 00
	Bird & MacDonald		4 00

ESTATE OF JOHN MCCULLOUGH.

1921.			
Feb. 7.	To Commission	$	1 35

ESTATE OF HUGH MCGINNIS.

1921.			
Jan. 18.	To Commission	$	0 60

ESTATE OF ALEXANDER MCDONALD.

1921.			
April 4.	To Commission	$	8 07
	Ellis & Brown		16 20
	"Daily Sun"		9 30
	T. J. Kearney & Co.		100 00
	General Hospital		39 30
	Dr. Vrooman		41 44
	Probate duty		1 02
	Sundries		3 05

ESTATE OF JAMES MCCONNELL.

1921.			
Aug. 4.	To McTaggart & Ellis	$	15 00
	Commission		5 00

ESTATE OF ELISHA T. MCGUIRE.

1921.			
	To Dr. Gourlay	$	65 00
	St. Paul's Hospital		45 92
	Taxes, Lots 27, 28/26/36		30 25

ESTATE OF DUNCAN MCDOUGALL.

1921.			
Jan. 11.	To Commission	$	83 09
	Insurance		28 70
	Probate and succession duty		360 75
	Taxes, Lot 19, Lot 52		205 38
	" " "		188 78
	Sundries		2 50

ESTATE OF FRANK S. MACKENZIE.

1921.			
Oct. 7.	To Probate duty	$	36 21
	Commission		49 35
	"Daily Province"		5 30
	Wilson, Whealler & Symes		57 50
	Sundries		1 50

CR.

ESTATE OF KIYOSHI MURATA.

1921.			
Aug. 10.	By Sun Life Insurance Co.	$	1,946 90

ESTATE OF ELIZA J. MILLS.

1921.			
Dec. 31.	By Bank of Montreal	$	6,189 70

ESTATE OF ELLEN MCCANN.

1921.			
April 18.	By Bonds	$	420 56

ESTATE OF WILLIAM J. MACPHERSON.

1921.			
Jan. 6.	By Cash	$	22 90
	Effects		1 50
	Royal Bank		572 71

ESTATE OF DANIEL MCSHERRY.

1921.			
Jan. 7.	By Cash	$	182 52
	H. S. Cranswick		50 00
	Bank of Commerce		1,471 80
	Refund of taxes		1 00

ESTATE OF JOHN MCCULLOUGH.

1921.			
Jan. 18.	By Cash	$	26 90

ESTATE OF HUGH MCGINNIS.

1921.			
Feb.	By Cash	$	12 00

ESTATE OF ALEXANDER MCDONALD.

1921.			
Mar. 29.	By Bank of Nova Scotia	$	161 36
	Effects		62 00

ESTATE OF JAMES MCCONNELL.

1921.			
July 27.	By F. B. Lewis	$	50 00

ESTATE OF DUNCAN MCDOUGALL.

1921.			
April 6.	By Rent	$	168 70
	E. ½ Lot 6, Blk. 10/192		1,336 30

ESTATE OF FRANK S. MACKENZIE.

1921.			
Oct. 4.	By Bank of Montreal	$	987 11

DR.

ESTATE OF JOSEPH NIEWAZNY.

1921.			
April 4.	To Sundries	$ 1	20
	Amelia Niewazny	1,609	67
	H. O. Alexander	3,219	99

ESTATE OF LAURA C. NAPIER.

1921.			
Dec. 2.	To Craig & Parkes	$ 31	65
	Commission	5	00

ESTATE OF CHARLES NIKIELS.

1921.			
Jan. 11.	To Congdon, Campbell & Meredith	$ 36	80
	Commission	24	00
	Releasing mortgage	4	50
	"Daily Province"	7	05
	Sundries	1	50

ESTATE OF TOMEZO NAKAYMA.

1921.			
Oct. 7.	To T. Sakamoto	$ 366	75
	Commission	33	50
	T. Stagi	153	35
	Sundries		75

ESTATE OF DANIEL O'MEARA.

1921.			
Jan.	To Probate duty	$ 2	30
	Eagle Timber Co.	57	40
	Commission	16	49
	"Daily Sun"	9	00
	G. J. Boyd	25	75
	Sundries		50

ESTATE OF PETER OLSEN.

1921.			
June 1.	To Farris & Emerson	$ 16	25
	St. Paul's Hospital	11	50
	Commission	10	68
	T. J. Kearney & Co.	129	00
	"Daily Province"	7	35
	Dr. McAlpine	35	27
	Sundries	3	55

ESTATE OF JOHN O'BRIEN.

1921.			
June 23.	To Probate duty	$ 7	44
	"Daily Sun"	9	00
	R. W. Eyer	176	52

ESTATE OF CLAUDE C. PURDY.

1921.			
Nov. 4.	To Commission	$ 1	32
	Sundries	2	75
	H. Purdy	13	56

ESTATE OF ALBERT E. PRETTY.

1921.			
Jan. 7.	To "The World"	$ 19	55
	Davis & Co.	69	05
	Commission	48	55
	Sundries		50
	R. Pretty	2,000	00

ESTATE OF NELS PETERSON (No. 1).

1921.			
Mar. 16.	To Dr. Manchester	$ 141	00
	Sundries	1	20

ESTATE OF CHARLES J. PLACE.

1921.			
Jan. 7.	To Harron Bros.	$ 160	00
	Commission	148	01
	J. Joseph	32	00
	Farris & Emerson	47	45
	"The World"	20	40
	T. W. Graham	15	00
	T. Craddock	16	00
	M. Anderson	34	50
	Travelling expenses to D'Arcy	31	10
	A. Thompson	34	50
	Sundries	2	75

ESTATE OF ALBERT G. PASCOE.

1921.			
Mar. 3.	To Dickie & DeBeck	$ 15	00
	"Daily Province"	9	00
	McAlpine & Campbell	78	35
	Probate duty	3	44
	Commission	13	90
	Sundries	1	50

CR.

ESTATE OF LAURA C. NAPIER.

1921.			
Nov. 23.	By Equity in land	$ 100	00

ESTATE OF CHARLES NIKIELS.

1921.			
Jan. 24.	By Lot 2, Lot 4, Blk. 8/394	$ 430	10

ESTATE OF TOMEZO NAKAYMA.

1921.			
Aug. 9.	By Cash	$ 3	00
	Launch	670	00

ESTATE OF PETER OLSEN.

1921.			
May 10.	By Bank of Commerce	$ 202	99
	Bank of Montreal	10	61

ESTATE OF ALBERT E. PRETTY.

1921.			
Nov. 10.	By Safe Deposit Co.	$ 920	90

ESTATE OF NELS PETERSON (No. 1).

1921.			
Jan. 26.	By Watch	$ 8	00

ESTATE OF CHARLES J. PLACE.

1921.			
Jan. 24.	By Lumber and effects	$ 40	00
	Bank of Montreal	2,454	55
	Chickens	10	00
	Frank Neff	185	00
	Refund of survey fee	25	00
	Interest on mortgage	41	47

ESTATE OF ALBERT G. PASCOE.

1921.			
Feb. 28.	By Bank of Montreal	$ 278	09

DR.

ESTATE OF WILLIAM W. PURDY.

1921.			
Mar. 7.	To Congdon, Campbell & Meredith	$	78 60
	"The World"		19 55
	John Strand		246 40
	T. Marion		13 00
	Ray Johnson		502 30
	Commission		194 45
	R. P. Bishop		55 65
	Sundries		5 65

ESTATE OF NELS PETERSON (No. 2).

1921.			
May 2.	To Nunn & Thomson	$	155 00
	Yarwood & Durrant		27 70
	"Daily Province"		26 85
	Commission		158 23
	Sundries		1 75

ESTATE OF FRED P. PIEHL.

1921.			
May 2.	To A. MacNeill	$	39 45
	Edwards & Bell		200 00
	"The World"		19 55
	Commission		49 44
	W. C. Wilson		316 00
	Sundries		1 75

ESTATE OF MILAN PAVELICH.

1921.			
May 9.	To Probate duty	$	9 61
	Wilson & Jamieson		34 10
	Center & Hanna		85 25
	Courtenay Undertakers		200 00
	John Pavelich		106 65
	Commission		60 58
	"The World"		10 35
	Sundries		3 25
	Ann Pavelich		200 00

ESTATE OF GEORGE W. PRITCHETT.

1921.			
Dec. 2.	To J. Oliver	$	21 70
	Commission		4 10
	"Daily World"		7 36
	Sundries		50

ESTATE OF HENRY PRIOR.

1921.			
Dec. 2.	To Commission	$	4 86

ESTATE OF QUAN CHONG.

1921.			
Dec. 2.	To Nunn & Thomson	$	64 00
	Commission		3 65
	Sundries		35

ESTATE OF FRANCIS J. RAINE.

1921.			
Feb. 8.	To Interest on mortgage	$	200 00
	Commission		168 56
	Water		6 85
	Repairs to house		127 25
	Taxes on land		329 46
	T. H. Calland & Co.		25 00

ESTATE OF JOHN ROBB.

1921.			
Jan. 11.	To Water	$	6 30
	Taxes on land		151 00
	Commission		11 95
	R. B. Ellis		30 00
	Telegram		1 74

ESTATE OF SARAH RAE.

1921.			
June 28.	To R. G. Wolsley	$	20 00
	H. O. Alexander		239 87
	V. G. Rae		213 29
	M. F. Woolsley		213 29
	L. Wellington		213 29

ESTATE OF HUGH G. ROSS.

1921.			
Feb. 3.	To Ellis & Brown	$	27 40
	Harron Bros.		107 00
	"Daily Province"		2 65
	Canadian Financiers Co.		25 50
	Probate duty		2 57
	Dr. McNicholl		10 00
	Hotel Manitoba		7 00
	General Hospital		2 35
	Commission		12 91
	Sundries		1 50
	R. Ross		59 35

CR.

ESTATE OF WILLIAM W. PURDY.

1921.			
Feb. 18.	By Cash	$	138 93
	Bank of Commerce		2,133 20
	Effects		74 25
	Refund of railway ticket		2 85
	Lot 8590, Cariboo		1,538 90

ESTATE OF NELS PETERSON (No. 2).

1921.			
Mar. 14.	By Effects	$	6 00
	Bank of Commerce		3,158 66

ESTATE OF FRED P. PIEHL.

1921.			
April 6.	By Cash	$	477 83
	Effects		8 50
	P.O. order		387 00
	Royal Bank		115 40

ESTATE OF MILAN PAVELICH.

1921.			
April 25.	By Cash	$	20 05
	Wages		11 70
	"		775 10
	"		404 85

ESTATE OF GEORGE W. PRITCHETT.

1921.			
June 13.	By Shingle-bolts	$	18 75
	"		63 20

ESTATE OF HENRY PRIOR.

1921.			
Nov. 11.	By Cash	$	90 25
	Watch		7 00

ESTATE OF QUAN CHONG.

1921.			
Nov. 3.	By Cash	$	73 05

ESTATE OF FRANCIS J. RAINE.

1921.			
Jan. 10.	By Rifle	$	5 00
	Rents and interest		1,397 59
	M. Morrison, mortgage		1,873 60

ESTATE OF JOHN ROBB.

1921.			
Feb. 9.	By Interest	$	14 00
	Rents		150 00

ESTATE OF HUGH G. ROSS.

1921.			
Jan. 18.	By Bank of Commerce	$	256 73

DR.

ESTATE OF GEORGE H. RYMAN.

1921.			
Dec. 7.	To W. H. Hadley	$	22 10
	Powell River Co.		14 93
	Center & Hanna		25 00
	H. B. Dickson		47 50
	Commission		14 70
	Sundries.		50

ESTATE OF SAMUEL ST. ONGE.

1921.			
Oct. 7.	To Marie Lynch	$	933 46

ESTATE OF HELMAR G. SJOHOLM.

1921.			
Nov. 16.	To Probate duty	$	3 07
	Consul for Sweden		206 05
	Sundries		1 20

ESTATE OF SUNDAR SINGH.

1921.			
April	To Fisher & Johnson	$	29 85
	"		763 09
	Sundries		1 20
	W. S. Hamilton		1,526 19

ESTATE OF DOMINIQUE SEIN.

1921.			
Jan. 11.	To Martin Sein	$	350 00
	Taxes on Lot 21/27/7		15 39

ESTATE OF LAM SINGH.

1921.			
April 14.	To Consul for China	$	1,018 06

ESTATE OF HERMAN SCHWARZ.

1921.			
Jan. 6.	To M. Gordon, for heiress	$	420 00
	Water		10 20
	Repairs to house		477 53
	Taxes, Lot 8/46/301		41 30
	Commission		33 18

ESTATE OF JOHN SODERBERG.

1921.			
July 20.	To Taxes, Lot 6/620/478	$	42 83
	McTaggart & Ellis		7 50
	Sundries		1 50

ESTATE OF JESSIE STOUT.

1921.			
July 7.	To "The World"	$	2 20
	Dr. Shewan		36 50
	Commission		11 40
	John S. Stout		40 00

ESTATE OF WILLIAM SUTHERLAND.

1921.			
Feb. 8.	To A. MacKenzie	$	82 70
	A. E. McDonald		17 30
	Patterson, Chandler & Co.		100 00

1921.	ESTATE OF SVEND P. SVENDSON.		
Jan. 7.	To J. Oliver	$	28 60
	Commission		18 18
	"Daily Sun"		9 60
	C. O. Lynn Co.		274 80

1921.	ESTATE OF MIKE SYDORUK.		
Jan. 7.	To Probate duty	$	2 25
	Commission		6 22
	Sundries		2 10
	Peter Sydoruk		148 88

1921.	ESTATE OF MARTHA SIMPSON.		
Feb. 3.	To W. G. Anderson	$	61 35
	Dr. E. H. Funk		150 00
	Probate duty		17 40
	"The World"		20 40
	Mount Pleasant Undertakers		164 00
	General Hospital		54 50
	Commission		88 30
	Dr. Turnbull		5 00
	Sundries		1 75

1921.	ESTATE OF PETER SALDUK.		
Mar. 3.	To H. D. Hulme	$	60 45
	Probate duty		13 75
	Nunn & Thomson		99 50
	Commission		72 13
	J. Salduk		20 00
	"Daily Province"		14 90
	Sundries		3 95
	Joe Salduk		300 00

CR.

ESTATE OF GEORGE H. RYMAN.

1921.			
Nov. 20.	By Cash and cheques	$	293 98

ESTATE OF HERMAN SCHWARZ.

1921.			
Jan. 6.	By Rent	$	100 00
	J. Glass, mortgage		304 70
	P. Burt, mortgage		471 90

ESTATE OF JESSIE STOUT.

1921.			
July 4.	By Payment under agreement	$	120 00

1921.	ESTATE OF MIKE SYDORUK.		
Jan. 19.	By Effects	$	35 00

1921.	ESTATE OF MARTHA SIMPSON.		
Jan. 28.	By Bank of Montreal	$1,766	10

1921.	ESTATE OF PETER SALDUK.		
Feb. 25.	By Royal Bank	$	722 29
	Bank of Commerce		720 34

DR.

ESTATE OF WILLIAM STEWART.

1921.			
April 5.	To McTaggart & Ellis	$	39 15
	Commission		83 18
	Harron Bros.		190 00
	Edna Price		45 37
	Dr. Turnbull		5 00
	Spurr & Dunlap		55 02
	"The World"		20 70
	Sundries		1 50

ESTATE OF DEAN SWIFT.

1921.			
April 5.	To G. Jones	$	76 80
	Probate duty		22 57
	Commission		91 78
	"The World"		4 84
	Commission		55 00
	Sundries		8 95

ESTATE OF GEORGE SATHER.

1921.			
May 26.	To Probate duty	$	30 23
	Sundries		1 20
	C. B. Stahlschmidt		2,771 76

ESTATE OF NICK TINGAS.

1921.			
April 21.	To Arthur Tingas	$	360 08

ESTATE OF JAMES TEEN.

1921.			
Jan. 26.	To "Daily Sun"	$	18 00
	McTaggart & Ellis		28 15
	Commission		40 34
	Armstrong & Simpson		125 00
	Nunn & Thomson		171 50
	D. Vanstone		10 00
	Sundries		1 50
	Dr. McAlpine		50 00

ESTATE OF ANGELO TETI.

1921.			
Jan. 7.	To Eusebia Teti	$	690 00
	Water rates		127 80
	Repairs to houses		500 25
	Commission		144 96
	G. Duncan		199 80
	Taxes, Lot 14/4/630		349 65
	Insurance		57 00
	Interest on mortgage		180 00
	Taxes, Lot 32/192/196		472 38
	George Duncan		226 30
	Taxes, Lots 11, 12/60/264A		73 37
	Insurance		114 00
	Taxes, Lot 32/192/196		110 04

ESTATE OF GEORGE THOMAS.

1921.			
April 5.	To "The World"	$	10 35
	T. J. Kearney & Co.		153 00
	Russell, Hancox & Anderson		29 05
	Commission		29 66
	Sundries		2 00

ESTATE OF FREDERICK TAYLOR.

1921.			
Nov. 4.	To Farris & Emerson	$	36 10
	Commission		6 69
	P. L. Cameron		3 00
	"Daily World"		2 76
	Probate duty		1 33
	Sundries		2 60

ESTATE OF OLE WINOSS.

1921.			
Feb. 21.	To Hans Winoss	$	64 10

ESTATE OF JOHN WARTON.

1921.			
Feb. 3.	To Probate duty	$	4 75
	Nunn & Thomson		128 50
	Commission		23 80
	"Daily Sun"		8 40
	Dickie & DeBeck		27 40
	Sundries		2 10

ESTATE OF KAY WILLIAMS.

1921.			
Dec. 2.	To Commission	$	1 50

CR.

ESTATE OF WILLIAM STEWART.

1921.			
Mar. 24.	By Royal Bank	$	1,663 71

ESTATE OF CARL STROMQUIST.

1921.			
May 17.	By Effects	$	15 00

ESTATE OF DEAN SWIFT.

1921.			
April 1.	By Bank of Montreal	$	863 76
	Cash		10 00
	Dominion bonds		961 80

ESTATE OF JAMES TEEN.

1921.			
Jan. 20.	By Bank of Montreal	$	700 00

ESTATE OF ANGELO TETI.

1921.			
Feb. 2.	By Rents	$	2,989 17

ESTATE OF GEORGE THOMAS.

1921.			
Jan. 18.	By Cash	$	4 00
Mar. 31.	Bank of Toronto		589 20

ESTATE OF FREDERICK TAYLOR.

1921.			
Mar. 21.	By Pacific Lumber Co.	$	10 58
	Merchants' Bank		123 30

ESTATE OF JOHN WARTON.

1921.			
Feb. 22.	By Bank of Montreal	$	451 30

ESTATE OF KAY WILLIAMS.

1921.			
Aug. 31.	By Effects	$	30 00

DR.

ESTATE OF JOHN WISHART.

1921.			
Feb. 3.	To Ladner & Cantelon	$	39 50
	Probate duty		6 25
	Burial-plot		38 00
	Commission		30 91
	Sundries		2 50
	Edwards & Bell		216 95
	Margaret McDonald		284 00

ESTATE OF SAMUEL WHITEHEAD.

1921.			
Oct. 7.	To General Hospital	$	26 00
	J. Oliver		17 95
	Commission		7 60
	Sundries		50
	Nunn & Thomson		100 00

ESTATE OF HENRY G. WICHBERG.

1921.			
Nov. 4.	To Commission	$	5 24
	"Daily World"		7 36
	Ellis & Brown		12 00
	Sundries		1 35

ESTATE OF MAY YOUNG.

1921.			
Dec. 2.	To Burial-plot	$	25 50
	Center & Hanna		129 75
	Congdon, Campbell & Meredith		60 00
	Pemberton & Son		318 00
	Commission		44 90
	"Daily Province"		8 00
	Sundries		2 00

CR.

ESTATE OF JOHN WISHART.

1921.			
Jan. 20.	By Royal Bank	$	209 72
	Ladner & Cantelon		108 39
	Accident insurance		300 00

ESTATE OF SAMUEL WHITEHEAD.

1921.			
Oct. 4.	By Bank of Montreal	$	152 05

ESTATE OF HENRY G. WICHBERG.

1921.			
Oct. 14.	By Bank of Commerce	$	104 74

ESTATE OF FREDERICK WILSON.

1921.			
Dec. 27.	By Wages	$	11 90

ESTATE OF MAY YOUNG.

1921.			
Nov. 11.	By Refund, B.C. Electric Rly...	$	2 34
	Furniture and effects		601 55
	Royal Bank		279 23
	Cash		15 00
	Rent		25 00

R. B. ELLIS,
Official Administrator.

COUNTY COURT, DISTRICT OF VICTORIA.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1921, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF MARGARET ALSTON.

1921.			
Feb. 9.	To Aikins, Loftus, Atkins, Williams & Fisher	$	30 60
	Mrs. Margaret Gee		186 34

ESTATE OF ALBERT E. ARMBRUSTER.

1921.			
Mar. 30.	To White & Martin, solicitors for Laura B. Armbruster..	$	718 34

ESTATE OF ARCHIBALD MACLAGAN ANDREWS.

1921.			
Jan. 5.	To White & Martin	$	34 75
Jan. 31.	Commission		2 94
Mar. 31.	"		1 50
April 18.	Stewart Monumental Works		232 00
April 30.	Commission		40 00
June 30.	"		25
	Expressing jewellery to England and postage		2 70
Nov. 9.	White & Martin, solicitors for heirs		3,129 99

ESTATE OF JOSEPH BEDDARD.

1921.			
Feb. 28.	To Commission	$	10 53
Mar. 1.	Sands Funeral Co.		100 00
	Macfarlane & Boyle		81 30
	"Colonist," advertising		6 00
Mar. 31.	Commission		7 48
May 31.	"		7 48
June 3.	Dr. H. J. Wasson		50 00
	Jubilee Hospital		50 00
	Sands Funeral Co.		100 00
Aug. 31.	Commission		5 68
Sept. 30.	"		1 79
Oct. 31.	Copy of letters of administration		1 00
Nov. 30.	Commission		7 48

CR.

ESTATE OF ARCHIBALD MACLAGAN ANDREWS.

1921.			
Jan. 25.	By Interest, Ames-Holden Tire Co.	$	58 80
Mar. 4.	Interest, Robert Simpson, stock		30 00
April 7.	Sale of Ames-Holden Tire Co. and Whalen Pulp Co. stock		800 00
June 28.	Sale of revolver and belt...		5 00

ESTATE OF JOSEPH BEDDARD.

1921.			
Feb. 10.	By Bank of Montreal	$	11 25
	Bank of Montreal, Ashcroft Estates, Ltd.		199 50
Mar. 4.	Ditto		149 60
May 5.	"		149 60
Aug. 25.	"		113 70
Sept. 29.	"		35 85
Nov. 29.	"		149 60

DR.

ESTATE OF E. P. COLLEY.

1921.			
Oct. 3.	To Saanich, taxes 10/47, Lots 1, 2, Map 882	$	7 98

ESTATE OF F. J. COLMAN.

1921.			
Aug. 17.	To Renewal of lease, Lot 791, Cassiar District	$	15 90
Nov. 5.	Renewal of lease, Lot 1388, Range 5, Coast District.		239 70
Dec. 5.	Ditto		39 75

ESTATE OF HANNAH B. CHANDLER.

1921.			
Mar. 1.	To Official Guardian	$	63 99

ESTATE OF JOSEPH A. E. CHANDLER.

1921.			
Mar. 1.	To Official Guardian	$	1,982 03

ESTATE OF JOHN CURRIE.

1921.			
Mar. 9.	To White & Martin, solicitors for heirs	$	467 12

ESTATE OF DAVID CLARKE.

1921.			
May 7.	To Deputy Provincial Secretary, funeral expenses	$	17 49

ESTATE OF HARRY WOLFF COMM.

1921.			
Aug. 31.	To Commission	$	6 64
Sept. 7.	Probate duty		33 09
Sept. 30.	Commission		57 30
	Rabbi E. Friedlander		25 00
	P. J. Sinnott, legal		110 00
Oct. 5.	"Times," advertising		8 00
Oct. 15.	Congregation the Emanu-El		50 00
	J. W. Cooper, certified copy of inquest		1 50
	Sands Funeral Co.		47 00
Oct. 17.	J. Katz		8 81
Oct. 31.	P. J. Sinnott, telegrams and advertising		23 70
Dec. 31.	Commission		77

ESTATE OF JAMES DENNY.

1921.			
June 25.	To Robert Denny	$	57 18

ESTATE OF JOHN OLIVER DONAHOO.

1921.			
Mar. 30.	To Bawden, Kidd & Co.	$	100 00
June 30.	Commission		25 00
Nov. 30.	"		27 50
	Postage		1 00

ESTATE OF JAMES DINEEN.

1921.			
Feb. 28.	To Commission	$	0 08
Mar. 31.	"		45
April 9.	B.C. Returned Soldiers' Commission, funeral		10 17

ESTATE OF JOHN ERSKINE.

1921.			
Feb. 15.	To White & Martin, legal account and probate duty	$	33 61
Mar. 1.	"Times," advertising		3 50

ESTATE OF BARTHOLOMEW EDMUNDS.

1921.			
Jan. 31.	To Commission	$	0 09
Mar. 8.	Miss M. L. Ringland		17 80
Mar. 31.	Commission		3 23
April 8.	City of Victoria, funeral and Hospital		92 95

ESTATE OF CATHERINE ECKER.

1921.			
May 31.	To Commission	$	55 20
	Barnard, Robertson, Heisterman & Tait		153 51
June 3.	"Times," advertising		3 50
June 18.	Anthony M. Ecker		297 31
	Alphonse T. Ecker		297 31
	Louis J. Ecker		297 32

ESTATE OF EDWARD FISHER.

1921.			
Feb. 24.	To Saanich, taxes, Lot 9	$	3 32
May 12.	Elliott, Maclean & Shandley		73 62
Sept. 20.	Saanich taxes, Lot 9		2 80
Nov. 30.	Postage		1 00

CR.

ESTATE OF HARRY WOLFF COMM.

1921.			
Aug. 25.	By Cash per Sinnott & Green	$	132 81
Sept. 17.	E. E. Blackwood, cash for travellers' cheques		1,059 25
	J. Katz, sale of one pair scales		75
Sept. 22.	I. Bronstein, sale of rings		76 80
	C.P.R., refund U.S.A. immigration tax		9 20
Dec. 22.	A. Hemingway, sale of pillows, scales, and rings		15 45

ESTATE OF JOHN OLIVER DONAHOO.

1921.			
June 27.	By Nebraska Investment Co.	$	500 00
Nov. 18.	" "		550 00

ESTATE OF JAMES DINEEN.

1921.			
Feb. 10.	By Cash, City Police	$	0 25
	Bank of Montreal		1 45
Mar. 15.	Board of Pensions Commission of Canada		0 00

ESTATE OF BARTHOLOMEW EDMUNDS.

1921.			
Jan. 6.	By A. Hemingway, sale of tools	$	1 80
Mar. 8.	Bank of Montreal		64 77

ESTATE OF CATHERINE ECKER.

1921			
May 17.	By Sale of equity in W. ½ Lot 11, Map 74A	$	1,102 62
May 21.	Refund of fire insurance		1 53

DR.

ESTATE OF ETHEL MARGARET FAHRMBACHER.

1921.			
Feb. 28.	To Commission	$ 8	54
Mar. 2.	Probate duty	6	06
Mar. 30.	Yates & Jay	31	20
	"Colonist," advertising	2	70
Mar. 31.	Commission	14	75
April 8.	B.C. Lands, rent	71	00
	Fred Foster, furrier	55	00
	St. Joseph's Hospital	14	50
	B.C. Funeral Co.	108	40
	R. Hall & Sons	20	00
	Soue Kee, laundry	13	00
	Dr. J. W. Lennox	25	00
	A. Monson, claim	87	90
Dec. 31.	Commission	1	12

ESTATE OF WILLIAM J. DUNDAS FRASER.

1921.			
Nov. 30.	To Commission	$ 0	34
Dec. 16.	"Times," advertising	3	40
Dec. 31.	Commission		17

ESTATE OF BLANCHE F. C. GRANCINI.

1921.			
Mar. 31.	To Commission	$ 5	15
April 21.	"Times," advertising certificate of title	15	00
April 30.	Commission	9	08
	Registering copy of letters of administration	1	00
May 9.	J. B. Clearihue	10	00
	A. J. Patton	43	00

ESTATE OF FREDERICK GASSON.

1921.			
July 6.	To G. H. Meredith, legal and probate duty	$ 13	80
	G. H. Meredith, solicitor for heirs	167	81
	Ditto	167	81
Oct. 31.	„	503	43

ESTATE OF WILLIAM GIBSON.

1921.			
Aug. 17.	To White & Martin, solicitors for Margaret J. Gibson	$ 281	34

1921. ESTATE OF HUGH GILLESPIE.

Feb. 28.	To Commission	$ 111	20
Feb. 14.	Searching titles	1	00
Mar. 1.	"Times," advertising	7	00
Mar. 9.	Dr. A. H. Tanner	35	00
Mar. 10.	Macfarlane & Boyle	159	10
Mar. 31.	Commission	25	50
April 23.	A. Coles, settlement of mortgage, Lot 3, Map 978	1,100	00
May 31.	Registering release of mortgage	1	00
July 25.	Macfarlane & Boyle	75	00
Aug. 17.	A. J. Patton	35	00
Aug. 31.	Commission	2	50
Nov. 9.	Mrs. J. Gillespie	292	18
	Mrs. J. A. G. Cavan	939	51

1921. ESTATE OF FANNY GEE.

April 30.	To Commission	$ 10	30
May 31.	"	1	78
	White & Martin	34	85
June 3.	"Colonist," advertising	2	80
July 30.	Commission		50
Aug. 25.	Probate duty	5	50
Sept. 30.	Commission	1	70
Oct. 5.	St. Joseph's Hospital	39	78
	Dr. G. Kenning	78	21

1921. ESTATE OF FRANCIS GILES.

May 31.	To Commission	$ 0	74
June 2.	Probate duty	6	40
June 30.	Commission	20	21
July 6.	"Times" advertising	3	50
	B.C. Funeral Co.	184	35
	St. Joseph's Hospital	70	00
	Miss H. I. Douglas	5	00
	J. S. Fowler	8	00
	White & Martin	41	80
July 30.	Commission	8	86
	Postage	1	00

CR.

ESTATE OF ETHEL MARGARET FAHRMBACHER.

1921.			
Feb. 25.	By A. Hemingway, sale of furniture and chickens	$ 170	80
Mar. 26.	Metropolitan Life Insurance Co.	294	90
Dec. 22.	A. Hemingway, deposit on fur coat	22	50

ESTATE OF WILLIAM J. DUNDAS FRASER.

1921.			
Nov. 25.	By Cash, Provincial Police	$ 0	23
	G. Harrocks, sale of charts	4	50
Nov. 28.	Canadian Bank of Commerce, Victoria	2	00
Dec. 3.	Canadian Bank of Commerce, North Vancouver	3	46

ESTATE OF BLANCHE F. C. GRANCINI.

1921.			
Mar. 4.	By Balance, sale of Lot 11, Map 252	$ 103	10

1921. ESTATE OF HUGH GILLESPIE.

Feb. 17.	By Sale of Equity in Lot 9, Map 982	$1,326	10
Feb. 24.	Sale of equity in Lot 6, Map 1130	897	90
Mar. 3.	Sale of furniture	509	99
Aug. 21.	Sale of Lot 3, Map 978	50	00

1921. ESTATE OF FANNY GEE.

April 27.	By Cash	$ 92	00
	Mrs. K. Gee	4	00
April 6.	Sale of old gold	2	00
April 27.	Sale of personal effects	33	52
July 19.	Board of Pensions Commission of Canada	10	00
Sept. 6.	Prudential Insurance Co.	33	90

1921. ESTATE OF FRANCIS GILES.

May 19.	By Cash	$ 8	50
May 27.	Sale of personal effects	6	23
June 9.	Imperial Bank	102	45
	Royal Bank	148	41
	Bank of Montreal	152	15
June 18.	Los Angeles Trust & Savings Bank	1	26
July 2.	A.O. Foresters	100	00
July 15.	Sale of personal effects	2	25
July 25.	Sale of Trozan stock	75	00

DR.

ESTATE OF WILLIAM JAMES GOODLET.

1921.			
June 30.	To Commission	$ 43	26
July 6.	"Colonist" advertising	3	00
	Probate duty	14	87
	Sands Funeral Co.	130	00
July 30.	Commission		84
	Hall & O'Halloran	82	20
Aug. 9.	M. A. Christie	5	00
	Dr. J. S. McCallum	38	00
	Jubilee Hospital	2	50
	Dr. T. McPherson	10	00
	Miss M. Walker	105	25
	Mrs. K. Walker	14	00
Aug. 17.	Hall & O'Halloran	30	00
Aug. 31.	Commission	44	76
Dec. 5.	Hall & O'Halloran	109	10

ESTATE OF CHRISTIAN HOLT.

1921.			
Dec. 31.	To Mrs. Elizabeth Holt	$ 6	15

ESTATE OF CHARLES A. HARRISON.

1921.			
Aug. 31.	To Searching title, Lots 6, 7, Map 2335	$ 1	00

ESTATE OF CHARLES INGLIS.

1921.			
July 25.	To Miss M. L. Ringland	$ 5	00
Aug. 26.	D. H. Slimming, attorney for Mrs. A. M. Inglis	128	43

ESTATE OF JANE KING.

1921.			
Aug. 18.	To Probate duty	$ 9	94
	Courtney & Elliott	19	00
	Charles King	170	72
	Official Guardian, share Fanny King	341	44

ESTATE OF OLIVER JAMES KNIGHTS.

1921.			
Sept. 20.	To Saanich, 1921 taxes, Lot 10, Map 1893	$ 5	50
Oct. 31.	Commission	10	00
	City of Victoria, 1921 taxes and arrears, Lot 11	512	32
Nov. 30.	Commission	23	47
Dec. 5.	Registering deed, Lot 10, Map 1893	5	30

ESTATE OF DAVID LINDSAY.

1921.			
Aug. 31.	To Commission	$ 15	36
	Dunlop & Foot	40	00
Oct. 31.	Postage	1	00
	Mrs. A. Hesson	151	50

ESTATE OF LUCY LAWRANCE.

1921.			
Nov. 30.	To Postage	$ 1	00

ESTATE OF ELIZA MARSHALL.

1921.			
Feb. 24.	To Barnard, Robertson, Heisterman & Tait	$ 10	85

ESTATE OF A. J. MOFFATT.

1921.			
April 30.	To Commission	$ 9	50
	Search, Land Registry Office	1	00
May 9.	Ernest William Friend, executor	179	50

ESTATE OF JOHN MARTIN.

1921.			
July 25.	To Yates & Jay	$ 10	00
July 30.	Expressing jewellery and postage	2	00
	Mrs. Frances Barber	105	85

ESTATE OF JOSEPH MORROW.

1921.			
April 30.	To Commission	$ 5	37
May 2.	Hall & O'Halloran	21	53
	"Colonist"	2	90

ESTATE OF FRANCIS MARGARET MANN.

1921.			
June 30.	To Commission	$ 4	16
July 6.	White & Martin	14	25
Aug. 17.	Mrs. R. Holdcroft	64	85

CR.

ESTATE OF WILLIAM JAMES GOODLET.

1921.			
June 13.	By Provincial Government, wages	$ 37	27
June 14.	Bank of Montreal	585	94
	Sale of Victory bonds	237	50
June 27.	C.P.R. refund of ticket	4	50
July 15.	Sale of personal effects	16	83
Aug. 4.	Excelsior Life Insurance Co.	895	30

ESTATE OF FRED HOWARTH.

1921.			
Dec. 30.	By Cash, Westholme Hotel	$ 279	65

ESTATE OF JANE KING.

1921.			
June 25.	By Estate, Arthur Camp	$ 541	10

ESTATE OF OLIVER JAMES KNIGHTS.

1921.			
Oct. 25.	By Deposit, sale of Lot 11, Victoria City	$ 200	00
Nov. 18.	Balance, sale of Lot 11, Victoria City, and property taxes	469	45

ESTATE OF DAVID LINDSAY.

1921.			
Aug. 18.	By Merchants' Bank	$ 207	86

1921. ESTATE OF A. J. MOFFATT.

April 22.	By Sale of W. 52 feet of Lot 49, Map 332	$ 190	00

1921. ESTATE OF JOSEPH MORROW.

April 27.	By Bank of Montreal	$ 107	51

ESTATE OF FRANCIS MARGARET MANN.

1921.			
June 13.	By Canadian Bank of Commerce	$ 83	26

DR.

ESTATE OF THOMAS McCORMICK.

1921.			
Feb. 24.	To Barnard, Robertson, Heisterman & Tait	$	2 50
Sept. 20.	Saanich, taxes, 1921.		2 80

ESTATE OF JOHN GREGOR McLEAN.

1921.			
Feb. 24.	To N. W. Whittaker, for Miss F. McLean	$	175 00
Oct. 31.	Commission		1 25
Nov. 30.	„		18 88
	Postage		1 00

ESTATE OF ANNIE McKENZIE.

1921.			
Jan. 31.	To Commission	$	1 67
Feb. 2.	Taxes, 1920, Lot 13		48 90
Feb. 5.	Commission		202 48
Feb. 15.	C. W. Bradshaw		163 43
Feb. 26.	Taxes, Oak Bay, 1920		123 80
Mar. 3.	„ „		100 00
Feb. 26.	Saanich, taxes, 1920		38 48
	Provincial Government, taxes, 1920		310 55
Mar. 1.	Victoria City, 1920, taxes and arrears		4,970 59
Mar. 31.	Commission		4 93
April. 30.	„		15 05
May 12.	Victoria City, local improvement		381 40
May 31.	Commission		3 32
June 15.	Saanich, taxes, 1921		10 40
	Oak Bay, taxes, 1921		53 67
	Island Investment Co.		1,300 00
June 30.	Commission		3 58
July 19.	Succession duty, Manitoba		277 73
	Brett & Kerr, bond		28 00
July 30	Commission		2 73
Aug. 25.	C. W. Bradshaw		278 00
Aug. 31.	Commission		3 32
Sept. 30.	„		3 33
Oct. 31.	„		3 32
	J. Black		20 00
Nov. 9.	Victoria, taxes, 1921		684 73
Nov. 30.	J. Black		7 50
	Commission		3 33
Dec. 16.	Commission, sale of Parish Lot 26, Manitoba		350 00
	R. L. Cox, collecting		330 00
Dec. 31.	Commission		5 68
	Provincial Government, 1922 taxes		75 80

ESTATE OF ALBIN NICHOLSON.

1921.			
Mar. 31.	To Commission	$	1 38
Nov. 11.	A. J. Patton		25 00
	A. Chilberg, attorney for heirs		818 49

ESTATE OF KENNETH NICHOLSON.

1921.			
June 30.	To Commission	$	55 16
July 6.	Registrar, Supreme Court		93 08
	"Times," advertising		5 25
July 30.	Commission		4 00
Nov. 5.	MacKay & Miller		62 00
Nov. 30.	Postage		1 00

ESTATE OF PAUL PRANCE.

1921.			
Aug. 31.	To Commission	$	4 31
	T. M. Miller		50 00
	Taxes, 1920–21, Lot 9, Map 398c		31 86
Sept. 30.	Commission		75
Oct. 31.	„		1 01
Nov. 30.	„		90

ESTATE OF ANN ELIZABETH POWELL.

1921.			
Jan. 5.	To B.C. Funeral Co.	$	45 00
	Dr. A. C. Sinclair		49 00
	Jubilee Hospital		37 25
	Victoria City		20 00
Feb. 2.	Miss Denham		19 00
May 31.	Commission		4 40
June 3.	Probate duty		5 76
Aug. 25.	Barnard, Robertson, Heisterman & Tait		56 05
Aug. 26.	Elizabeth Powell		234 91
	Kate Powell		46 98
	James Powell		46 98
	Thomas Powell		46 98
Dec. 5.	Joseph Powell		46 98

CR.

ESTATE OF JOHN GREGOR McLEAN.

1921.			
Oct. 6.	By Sale of watches	$	25 00
Nov. 10.	U.S.A. pension		377 77

ESTATE OF ANNIE McKENZIE.

1921.			
Jan. 1.	By Rent of houses	$	33 25
Feb. 1.	„		42 75
	Bass mortgage		1,200 00
Feb. 4.	Sale of Lot 13, Map 903		2,406 95
	Deposit, sale of half Parish Lot 26		400 00
Mar. 1.	Rent of houses		98 60
April 1.	„		63 25
April 5.	Half-rent of farm, Manitoba		237 80
May 1.	Rent of houses		66 50
June 1.	„		66 50
June 21.	Rent of Lot 17		5 00
July 1.	Rent of houses		54 50
Aug. 1.	„		66 50
Aug. 17.	Balance, sale of half Parish Lot 26		6,600 00
Sept. 1.	Rent of houses		66 50
Oct. 1.	„		66 50
Nov. 1.	„		66 50
Dec. 1.	„		66 50
Dec. 13.	Cameron agreement		47 00

ESTATE OF ALBIN NICHOLSON.

1921.			
Mar. 1.	By H. Josephson, refund collector, Bank of B.N.A.	$	27 50

1921. ESTATE OF KENNETH NICHOLSON.

June 22.	By Bank of Montreal	$1,095	35
June 23.	Cash		7 80

ESTATE OF PAUL PRANCE.

1921.			
Aug. 15.	By Sale of Lot 9, Map 398c	$	86 25
Sept. 15.	Payment on Lot 9, Map 398c		13 00
Oct. 15.	„ „		20 25
Nov. 17.	„ „		18 05

ESTATE OF ANN ELIZABETH POWELL.

1921.			
May 27.	By Sale of personal effects	$	87 97

DR.

ESTATE OF ALFRED THOMAS PEARSE.

1921.				
Aug. 31.	To	Commission	$	10 80
Oct. 15.		B.C. Funeral Co.		100 00
		Dr. E. W. Boak		20 00
Oct. 17.		Walls, Walls & Sedger		19 57
		W. DeGruchy		31 31
Oct. 31.		Commission		05

ESTATE OF EMMA RALPH.

1921.				
April 16.	To	Crease & Crease	$	51 55
April 30.		Commission		5 00
May 2.		Crease & Crease, for distribution to heirs		176 95

ESTATE OF WILLIAM ASHER ROUNTREE.

1921.				
Nov. 30.	To	Commission	$	6 50
Dec. 31.		"		2 03
		Pooley, Luxton & Pooley		56 45

ESTATE OF GILLES SERRAND.

1921.				
July 30.	To	Commission	$	0 09

ESTATE OF MONGOL SINGH.

1921.				
Nov. 30.	To	Postage	$	1 00

ESTATE OF CHRISTOPHER STAFFORD.

1921.				
Jan. 31.	To	Commission	$	0 32
May 6.		Insurance premium		15 20
May 31.		Commission		1 00
June 3.		Saanich, water		1 50
June 30.		Commission		67
July 30.		"		9 50
Aug. 9.		Bodwell & Lawson, for Betsy H. Stafford		296 61

ESTATE OF RICHARD SHORE.

1921.				
July 30.	To	Commission	$	12 73
		Postage		1 00
Aug. 11.		Yates & Jay, for W. T. Shore		207 32

ESTATE OF N. G. HONG SOON.

1921.				
Sept. 6.	To	White & Martin, solicitors for next of kin	$	473 95

ESTATE OF GERARD STANKEN.

1921.				
Jan. 31.	To	Commission	$	0 43

ESTATE OF ROSALIA ST. LOUIS.

1921.				
June 30.	To	Commission	$	14 98
July 6.		C. L. Harrison		82 35
		"Times," advertising		5 25
		Registrar, Supreme Court		19 45

ESTATE OF MARY ANN TORRANCE.

1921.				
Sept. 30.	To	Commission	$	36 07
Oct. 5.		Monteith & Campbell		27 00
Oct. 15.		Sands Funeral Co.		157 00
Oct. 31.		"Times," advertising		3 50

ESTATE OF OLGA MAUD VALE.

1921.				
July 6.	To	White & Martin, for Chas. A. Vale	$	93 00

ESTATE OF FREDERICK VEITCH.

1921.				
Mar. 31.	To	Commission	$	11 41
May 14.		Official Administrator, Nanaimo		216 81

CR.

ESTATE OF ALFRED THOMAS PEARSE.

1921.				
Aug. 31.	By	Cash, City Police	$	211 30
Oct. 14.		Royal Bank		97

ESTATE OF EMMA RALPH.

1921.				
April 18.	By	Release of mortgage, Lots 7, 8, Map 1272	$	100 00

ESTATE OF WILLIAM ASHER ROUNTREE.

1921.				
Nov. 8.	By	Cash	$	14 55
Nov. 25.		Sale of furniture and chickens		115 60
Dec. 16.		Bank of Montreal		40 54

ESTATE OF GILLES SERRAND.

1921.				
July 27.	By	Final dividend, Washington Savings Bank	$	1 71

ESTATE OF CHRISTOPHER STAFFORD.

1921.				
Jan. 1.	By	Rent, Alder Street	$	6 65
May 1.		" "		19 95
June 1.		" "		11 80
June 24.		Water, Alder Street		1 50
July 7.		Sale of Lot 2, Map 2329		190 00

ESTATE OF RICHARD SHORE.

1921.				
July 9.	By	Yates & Jay, Boorman note	$	154 65

ESTATE OF GERARD STANKEN.

1921.				
Jan. 1.	By	Balance, payment on boathouse	$	8 55

ESTATE OF ROSALIA ST. LOUIS.

1921.				
June 15.	By	Executor of estate, E. J. Bitancourt	$	299 65

ESTATE OF MARY ANN TORRANCE.

1921.				
Sept. 30.	By	Canadian Bank of Commerce	$	721 41

ESTATE OF FREDERICK VEITCH.

1921.				
Mar. 21.	By	Sale of stock and implements	$	228 22

R. L. COX,
Official Administrator.

YALE ELECTORAL DISTRICT.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1921, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF AUSTIN NOBLE WISMER.

1921.			
June 30.	To W. G. Bestwick	$	128 97

ESTATE OF M. B. MUNDLE.

1921.			
Oct. 31.	To A. G. Rebagliati	$	5 00
	Dr. H. R. Fort		6 77
	A. M. Ruddock		10 01
	McIntosh & Baillie		10 15
	R. D. Burch		13 29
Nov. 30.	M. L. Grimmett		4 45
	Dr. H. R. Fort		13 51
	A. M. Ruddock		19 94
	McIntosh & Baillie		20 25
	R. D. Burch		26 48

ESTATE OF AH SING.

1921.			
Jan. 31.	To James Murphy	$	27 18

ESTATE OF MINNIE CHAMBERS.

1921.			
Mar. 16.	To Government Agent, Merritt	$	27 19

ESTATE OF JOHN FROHNWEISER.

1921.			
June 17.	To Custodian, Alien Enemy Property	$	339 93

ESTATE OF CHARLES W. MOREY.

1921.			
Sept. 30.	To M. L. Grimmett	$	11 15
	W. C. Parker		15 35

ESTATE OF BEN BAKER.

1921.			
Jan. 31.	To Exchange	$	0 45
Feb. 14.	N. J. Barwick		121 00
	W. C. Parker		40 20
	M. L. Grimmett		11 05
June 2.	Nelson Brewing Co., Ltd.		21 00

ESTATE OF JOHN SERVICE.

1921.			
Jan. 31.	To Exchange	$	0 40
	M. L. Grimmett		7 50
	W. C. Parker		72 00
Nov. 30.	McPherson & Brown		62 80

ESTATE OF TOMASO DOMICO (TOM DOMINICK).

1921.			
Nov. 30.	To Royal Consul-General for Italy	$	449 18

ESTATE OF ERNEST H. HAROLD.

1921.			
Jan. 31.	To Government Agent, Merritt	$	7 00
Aug. 30.	Exchange		75
	M. L. Grimmett		15 00
Oct. 31.	C. Harold		311 80

ESTATE OF SAMUEL DALLAS HARMON.

1921.			
June 2.	To Exchange	$	0 25

CR.

ESTATE OF M. B. MUNDLE.

1921.			
Nov. 12.	By Effa M. Mundle	$	84 63

ESTATE OF CHARLES W. MOREY.

1921.			
Aug. 28.	By Constable, Hazelton	$	94 50
Sept. 19.	Canadian Pacific Railway		49 20

ESTATE OF BEN BAKER.

1921.			
Jan. 4.	By Constable Willgoose	$	184 25
June 2.	James Baker		9 45

ESTATE OF JOHN SERVICE.

1921.			
Jan. 3.	By D. Coupland	$	150 00

ESTATE OF ERNEST H. HAROLD.

1921.			
Aug. 27.	By J. A. Guichon	$	300 00

ESTATE OF SAMUEL DALLAS HARMON.

1921.			
Feb. 15.	By L. W. Ingram	$	15 00
May 31.	„		10 00
Nov. 24.	„		38 20

M. L. GRIMMETT,
Official Administrator.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1922.

PROVINCE OF BRITISH COLUMBIA

REPORT

OF THE

PROVINCIAL MUSEUM

OF

NATURAL HISTORY

FOR THE YEAR 1921

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1922.

To His Honour WALTER CAMERON NICHOL,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

The undersigned respectfully submits herewith the Annual Report of the Provincial Museum of Natural History for the year 1921.

J. D. MACLEAN,

Provincial Secretary.

Provincial Secretary's Office,

Victoria, February, 1922.

PROVINCIAL MUSEUM OF NATURAL HISTORY,
VICTORIA, B.C., February 1st, 1922.

The Honourable J. D. MacLean, M.D.,
Provincial Secretary, Victoria, B.C.

SIR,—I have the honour, as Director of the Provincial Museum of Natural History, to lay before you the Report for the year ending December 31st, 1921, covering the activities of the Museum.

I have the honour to be,
Sir,
Your obedient servant,

FRANCIS KERMODE,
Director.

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REPORT *of the*

PROVINCIAL MUSEUM OF NATURAL HISTORY

FOR THE YEAR 1921.

By Francis Kermode, Director.

OBJECTS.

(*a.*) To secure and preserve specimens illustrating the natural history of the Province.

(*b.*) To collect anthropological material relating to the aboriginal races of the Province.

(*c.*) To obtain information respecting the natural sciences, relating particularly to the natural history of the Province, and diffuse knowledge regarding the same.

ADMISSION.

The Provincial Museum is open, free, to the public daily throughout the year from 9 a.m. to 5 p.m. (except New Year's Day, Good Friday, and Christmas Day); it is also open on Sunday afternoons from 1 p.m. to 5 p.m. from May 1st until the end of October.

VISITORS.

The actual number of visitors whose names are recorded on the register of the Museum is 22,550. This does not include Mr. and Mrs. and very often several members of a family; teachers and their classes whose attendance has increased materially during the last year in connection with their nature-studies; and it must be understood that these figures do not include Asiatics and others. The following figures will give some idea of those who recorded their names during the months of: January, 1,245; February, 1,567; March, 1,413; April, 1,221; May, 1,604; June, 1,876; July, 4,022; August, 4,614; September, 2,061; October, 1,347; November, 864; December, 716.

ACTIVITIES.

The Public Works Department, having completed the excavation of the basement of the Museum, carried on the work so as to put this portion of the building into shape for exhibition-rooms for anthropology. The floors have been cemented throughout, the walls all plastered, and windows had to be put in through the basement walls so as to give light and air. The Public Works Department also carried on its extensive work in regard to renewing the electric-light system and have it divided into sections, so that it is only necessary to use portions of the lighting system at times, thus practising economy to a great extent.

Since the Public Works Department has finished the alterations, the Director is now in a position to carry out the long-needed want of arranging the valuable anthropological material which has been stored for a number of years. This material has been transferred from the temporary building to the basement of the Museum, and is now practically safe from all danger of fire. All the anthropological exhibition which is now on the first floor of the Museum will be transferred to the basement, so as to arrange all the exhibition of this material according to the different tribes of Indians of this Province. The arrangement will be similar to that which was carried out in the exhibition on the first floor; that is, according to house and house furniture, implements of war and the chase, etc.

A carpenter has been employed for several months making cases for this material; the staff is now busily engaged in arranging the collection for exhibition, and it is hoped to have the exhibition halls of anthropology open to the public not later than May 1st.

The study series of mammals and birds, which were also stored in a temporary building, have now been removed to the study-room on the main floor of the Museum and are available to those visitors who wish to consult them.

A List of "The Flora of Vancouver and Queen Charlotte Islands" has been issued from the press and is now available to those students who are interested in botany, and no doubt will be quite a help in giving the distribution of the flora of Vancouver Island. We know that this list is to a great extent not complete, and hope that it will be the means whereby students will aid the Provincial collections by gathering material that is not represented in the collections from

some of the most outlying portions of Vancouver and Queen Charlotte Islands. In this way we will be able to get a more definite distribution of our Coast flora. Persons requiring the list are requested to make application to the Provincial Museum for the same. Additions and corrections to "The Flora of Vancouver and Queen Charlotte Islands" will be published from time to time in the Annual Reports of the Provincial Museum.

LOAN COLLECTION OF LEPIDOPTERA.

Mr. Frank Williamson in July, 1921, loaned to the Provincial Museum a wonderful collection of tropical Lepidoptera. These represented specimens from India, Australia, Ceylon, South America, Africa, Japan, Europe, and other countries. Mr. Williamson has been studying the Lepidoptera of the world for a number of years with regard to the similarity of species and geographic range, and this was the finest collection of butterflies and moths from different parts of the world that has ever been placed on exhibition in British Columbia. There were 196 specimens all beautifully mounted in Riker mounts, and it filled two large cases on the second floor of the Museum.

Although the Provincial Museum is a museum for the exhibition of the flora and fauna of British Columbia, when this collection was offered by Mr. Williamson as a loan, the Honourable Dr. J. D. MacLean, Provincial Secretary, readily granted permission to have the same put on exhibition. They were admired by thousands of visitors, numbers of them making a special visit to the Museum to see this wonderful display. Others came and made drawings and paintings for their own private collections. These specimens were returned to Mr. Williamson at the end of the calendar year.

MAMMALS.

Mr. E. W. Nelson, Chief of the Biological Survey, United States Department of Agriculture, Washington, D.C., asked that the study series of the chipmunks in the Provincial Museum be loaned to their Department, as Mr. A. H. Howell, a specialist, was working on this group. Seventy-eight skins from different districts on the Mainland of British Columbia were sent for study. The Department at Washington greatly appreciated the loan of these specimens, which proved of great service to Mr. Howell in his study of this group. Upon returning the specimens he wrote his identification on the labels.

The following is a list of the species and subspecies determined by Mr. Howell's examination of these skins. It is very much in evidence that intergrading among the species and subspecies to a very pronounced extent is taking place throughout the geographic range, as the following classification according to the species in the Province will show:—

Eutamias townsendi Bachm. Type locality, mouth of Columbia River. Geographical distribution, Coast region of Oregon, Washington, and British Columbia, from mouth of Columbia River northward, east in northern Cascades to head of Lake Chelan.

Eutamias amœnus felix Rhoads. Type locality, Mount Baker Range, Westminster District, British Columbia. Geographical distribution, Mount Baker Range, British Columbia; extent unknown.

Eutamias amœnus luteiventris Allen. Type locality, Chief Mountain Lake, Montana. Geographical distribution, Rocky Mountains in Montana from Helena northward into British America. Specimens examined: Okanagan, B.C., 9; Shuswap, B.C., 2; Cranbrook, B.C., 2.

Eutamias amœnus affinis Allen. Type locality, Ashcroft, British Columbia. Geographical distribution, Interior of British Columbia, east of the Cascade Mountains. Specimens examined: Okanagan, B.C., 18; Grande Prairie, B.C., 2; Similkameen, B.C., 9.

Eutamias amœnus ludibundus. Specimens examined: Moose Lake, B.C., 4; Lillooet, B.C., 8.

Eutamias amœnus affinis x *luteiventris.* Specimens examined: Okanagan, B.C., 3.

Eutamias amœnus luteiventris x *affinis.* Specimens examined: Okanagan, B.C., 6.

Eutamias amœnus affinis x *ludibundus.* Specimens examined: Similkameen, B.C., 1.

Eutamias amœnus ludibundus x *affinis.* Specimens examined: Lillooet, B.C., 1.

Eutamias minimus caniceps. Specimens examined: Atlin, B.C., 10.

Five black skins from near the headwaters of the Stikine River, two of which have been provisionally identified by Dr. C. Hart-Merriam as melanistic examples of *Eutamias borealis caniceps* in 1909. The other three specimens were sent to the Museum in 1918 by Mr. H. W. Dodd, Government Agent at Telegraph Creek. These three chipmunks were taken by an Indian on Groundhog Mountain, who states that in this particular locality the chipmunks are all black and

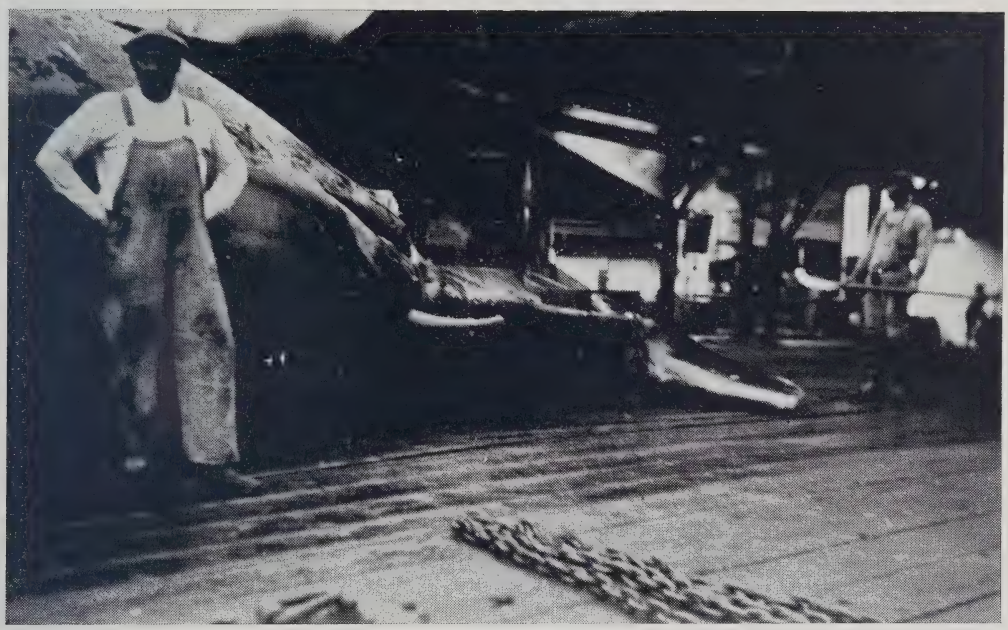

Fig. 1. Caudal part of the whale, showing the hind limb *in situ*.

quite plentiful. From this information it is reasonable to think that upon further research a new subspecies may be recognized. Much more material, however, and in better condition is wanted and very desirable. Dr. Merriam states they have in the collection at Washington one similar specimen from Lake Bennet.

From time to time numerous reports have reached this Department of chipmunks having been seen in various localities on Vancouver Island, but upon close investigation we have been unable to substantiate any proof of their occurrence, and I very much doubt if chipmunks were ever native inhabitants of Vancouver Island, although some time about the year 1898 Mr. Albert H. Maynard, of Victoria, B.C., collected two chipmunks on the beach at Esquimalt. These skins, I understand from Mr. Maynard, were given to the late John Fannin, who was Director of this Museum at that time, but I cannot find any record of these skins in this Department; presumably they must have been sent to some authority for verification and not returned. Until such time as these skins can be located and their identity established, we cannot include them in the local fauna of Vancouver Island. It is possible that these two chipmunks which Mr. Maynard mentions may have been two animals that had been in captivity and liberated. (F. K.)

With further reference to the Notes on Mammals on page 10, Prov. Mus. Rep. 1920, "Notes on the Occurrence of a Humpbacked Whale having Hind Legs," a description of this was published by Mr. Roy Chapman Andrews in the American Museum Novitates No. 9, and is herewith copied, giving further descriptions and conclusions in regard to this remarkable case of external hind limbs in a humpbacked whale.

This is printed with the object that through our Annual Report it may become known to local residents who may be interested in this extraordinary find at Kyuquot Station.

It appears to have made quite a stir with a number of scientists, and the Director is in receipt of correspondence from Dr. Othenis Abel, Professor de Palaeontologie an der Wiener Universitat, who has published several pamphlets on whales and who wishes further information, if possible, concerning this remarkable find.

A REMARKABLE CASE OF EXTERNAL HIND LIMBS IN A HUMPBACK WHALE.

By Roy Chapman Andrews.

In July, 1919, a female humpback whale (*Megaptera nodosa*) with two remarkable protrusions on the ventral side of the body, posteriorly, was captured by a ship operating from the whaling-station at Kyuquot, on the west coast of Vancouver Island, British Columbia.

One of the protrusions was cut off by the crew of the vessel, but the other was photographed *in situ* by the superintendent of the station. Mr. Sidney Ruck and Mr. Lawson, officials of the Consolidated Whaling Company, appreciated the importance of the discovery and presented the skeletal remains of the attachment to the Provincial Museum, Victoria, B.C.

At my request, Mr. Francis Kermode, Director of the Provincial Museum, very courteously submitted the bones to me with permission to publish upon the result of my examination.

Under date of March 4th, 1920, Mr. Ruck writes to Mr. Kermode as follows:—

"I enclose herewith three photographs showing the unusual development of the pelvic rudiments in a whale captured at the Kyuquot Station last July, of which you have the bones. It is to be regretted that better pictures in evidence of this unprecedented development were not obtained.

"I have been connected with the whaling industry for twenty-two years and during my time have come in contact with prominent naturalists, such as Professor True, of the Smithsonian Institute; Professor Lucas, of the Natural History Museum, Brooklyn;* and Professor Andrews, of the Natural History Museum, New York, and neither in their experience or mine have the protrusion of the pelvic bones beyond the body ever been seen or heard of.

"This particular whale was a female humpback of the average length, with elementary legs protruding from the body about 4 feet 2 inches, covered with blubber about ½ inch thick.

"As shown in the best photograph, these legs protruded on either side of the genital opening; the left leg was cut off by the crew of the vessel and lost, and the point at which it was cut off is clearly shown in the photograph. The end of the leg seen in the picture terminated in a kind of round knob like a man's clenched fist.

"The two bones of the leg which you have are connected by cartilage, which I was informed had shrunk about 10 inches, and possibly more by this time. At any rate, the total length of the

* Then of the U.S. National Museum, now of the American Museum of Natural History.

leg before it was cleaned of the blubber and flesh was, as before stated, about 4 feet 2 inches from the body."

After studying the material and discussing it with various scientists, I have come to the conclusion that the protrusions actually do represent vestigal hind limbs and show a remarkable reversion to the primitive quadripedal condition.

I am well aware that zoologists are inclined to accept reported instances of reversion with extreme reluctance, and that at first sight the tendency will be to consider this a teratological case of no reversionary significance, but the evidence is so strong that I cannot interpret it that way.

Mr. Ruck reports that the total length of the leg "before it was cleaned of the blubber and flesh" was about 4 feet 2 inches. The skeletal remains in my possession consist of two bones and two heavy cartilages. When placed in position as in Fig. 2, the total length is 31 inches.

Femur.—The larger bone is deeply concave proximally and to it is attached a massive cartilage (Fig. 3) which in its present shrunken condition is 5¼ inches in length and 1⅝ inches wide. I estimate that this cartilage was at least 15 inches long and 3 inches wide when fresh. I believe that this cartilage represents the femur. It probably lay entirely within the body, its proximal end being attached to the pelvic vestiges. Such a massive cartilage must necessarily have had a firm support and leads me to believe that the pelvic elements in this individual were of extraordinary size. The pelvic bones as usually present in the *Megaptera* are slender ossifications about 6 or 8 inches in length and would not furnish a firm enough base for the attachment of a cartilage which in its fresh condition was as large as a man's wrist.

Since the photograph of the limbs *in situ* shows that they were directly below the usual location of the pelvic vestiges, and since there are no other "floating" bones near this region, the conclusion that they were attached to the pelvic elements is entirely justifiable.

Tibia.—The larger of the two bones I identify as the tibia (Fig. 3). It is 14½ inches in greatest length, is well developed, and has a hard smooth outer surface. At the proximal end its greatest width is 3¾ inches, it narrows gradually for three-fourths of its length, and then suddenly expands at the distal extremity, where it is 2½ inches wide.

Tarsus.—The distal end of the tibia is convex and gives attachment to a cartilage which in its shrunken state is 4¾ inches long and 1¾ inches wide (Fig. 4). This cartilage, I believe, represents the tarsus. That it presents no ossifications is by no means surprising, as the carpal bones in the fore limbs of cetaceans are sometimes entirely absent and often in a more or less rudimentary condition. Mr. Ruck says: "The two bones of the leg which you have are connected by cartilage which I was informed had shrunk about 10 inches and possibly more by this time." This would give the tarsal cartilage a length of nearly 15 inches.

Metatarsal.—The distal element in the leg is a hard, well-developed bone which I identify as a metatarsal (Fig. 4). It has the characteristic shape of the metacarpals in the fore limbs of cetaceans, except that it is more slender. It is 6⅛ inches long, 1⅞ inches wide proximally, and 1⅞ inches in distal width; its least width is $^{15}/_{16}$ inch. To the distal end of the metatarsal is attached a heavy cartilage, of which only ¾ inch remains intact. This cartilage probably formed the extremity of the limb skeleton.

External Appearance of the Limb.—In reference to the limb as it appeared in the fresh condition, Mr. Ruck says that the end terminated in a "kind of round knob like a man's clenched fist," that the total length was about 4 feet 2 inches, and that it was covered with blubber about ½ inch thick. I infer from Mr. Ruck's description that the connective tissue and blubber were essentially the same as in the flipper, or fore limb, of cetaceans. The photograph of the limb *in situ* (Fig. 1) shows that there are two prominent, truncated tuberosities on the distal half. The proximal "bunch" evidently indicates the distal end of the tibia and the other is at the extremity of the metatarsal. These tuberosities may very properly be homologized with those on the outer, or anterior, edge of the flipper in the *Megaptera*, which indicate the extremities of the radius and the second digit. This is, I believe, a point which has considerable significance.

Since the stalk-like cartilaginous femur probably lay entirely within the body and the remainder of the limb entirely outside, there was undoubtedly a certain flexibility at the point of junction with the body.

In a paper entitled "Untersuchungen an walen,"* Professor W. Kükenthal has described external rudimentary hind limbs in three early embryos of *Megaptera*. These appear as two

* Jenaische Zeitschrift für Naturwissenchaft, Ll. 1914, pages 49–52.

Fig. 2. Skeleton of the hind limb. Fig. 3. Cartilaginous femur and osseous tibia.
Fig. 4. Cartilaginous tarsus and osseous metatarsal.

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more or less caudally directed papillæ on either side of the genital organ in the same relative position as the hind limbs which I have described in this paper. In Kükenthal's Stage I. (an embryo 32 mm. in length) the rudiments are best developed and are 1.2 mm. long. In Stage II. (an embryo 28 mm. long) the rudiments are somewhat less distinct, reaching a length of 0.8 mm. In Stage III. (an embryo 30 mm. long) the hind-limb rudiments have still more decreased in size and appear as minute papillæ.

Kükenthal has also discovered hind-limb rudiments in embryos of *Phocæna communis* and *P. dalli*, and Guldberg has recorded them in embryos of *Lagenorhynchus acutus* and *Phocæna communis*.

Kükenthal states that the hind-limb rudiments are found in later embryonic stages of the Mystacoceti than in the Odontoceti, and concludes that in the evolution of cetaceans the hind limbs lost their functional character in the Odontoceti earlier than in the Mystacoceti.

Since Kükenthal's and Guldberg's researches have shown that external hind-limb rudiments are still present in some cases in embryonic life, it is by no means impossible that these vestigial organs should continue their growth and persist until the adult stage. I believe that that is exactly what has occurred in the specimen which I have described above, and that we are confronted with a clear case of partial reversion to a primitive quadripedal condition.

The limbs, according to the statements of the whalers, were symmetrical; they are in the exact position in which the hind-limb rudiments have been found in embryonic *Megaptera;* there are strong indications that the cartilaginous femur was attached to the pelvic elements; they are homologous in many respects to the flippers, or fore limbs, and were this a teratological case it is doubtful if these homologies would exist.

Unwilling as are many evolutionists to accept reported cases of reversion, I can see no other explanation for the facts presented here. That this condition is extremely rare must certainly be true, for, so far as I am aware, this is the only recorded case among cetaceans. The presence of rudimentary hind limbs would almost certainly attract the attention of whalers under any condition and eventually be reported to a scientific institution, as was done in the case under consideration. Although hundreds of thousands of whales have been killed, especially in the last fifty years since the beginning of shore-whaling, no other instance has been reported. We are greatly indebted to Mr. Ruck and Mr. Lawson for their quick appreciation of the importance of their discovery, and I wish again to express my thanks to Mr. Kermode for giving me the privilege of describing it.

ORNITHOLOGY.

While no field-work has been done by the Department in the branch of ornithology, several persons who are very much interested in bird-life of this Province have made presentations of specimens to the Museum. One of the most rare specimens taken was presented by Mr. J. G. French, of Sooke, a white-winged dove (*Melopelia asiatica*), A.O.U. No. 319. This is the farthest northern record of this dove. The range of this bird in Lower California, Southern Arizona, Texas, Florida, south to Cuba, Jamaica, and Costa Rica. Accidental in Washington, one specimen being taken by Mr. J. H. Bowles, of Tacoma, November 7th, 1907. Concerning the specimen collected by Mr. J. G. French at Sherringham Point, Renfrew District, Vancouver Island, in July, 1918, he informs me that there were two of the birds together on that occasion, and without doubt this is now the most northerly record for this accidental visitor.

Other birds and specimens collected by several persons and presented to the Museum are herewith listed below.

ACCESSIONS.

Black Merlin (*Falco columbarius suckleyi*). Presented by Mr. W. Long, Mount Douglas, Victoria, B.C., January 18th, 1921.

Killdeer Plover (*Ægialitis vocifera*). Two specimens presented by Mr. Arthur Trill, Errington, B.C., April 19th, 1921.

North-western Red-wing (*Agelaius phœniceus caurinus*). Presented by Mr. Arthur Trill, Errington, B.C., April 19th, 1921.

North-western Red-wing (*Agelaius phœniceus caurinus*). Presented by Mr. H. Rawlings, Parksville, B.C., April 19th, 1921.

Killdeer Plover (*Ægialitis vocifera*). Presented by Mr. H. Rawlings, Parksville, B.C., April 19th, 1921.

Red-backed Rufous Hummingbird (*Selasphorus rufus*). Presented by Lizzie and John Dool, Ladysmith, B.C., April 22nd, 1921.

Bonaparte's Gull (*Larus philadelphia*). Two specimens presented by Miss Doreen Dodd, Telegraph Creek, B.C., June 8th, 1921.

Black-headed Grosbeak (*Zamelodia melanocephala*). Presented by Mr. H. Rawlings, Parksville, B.C., June 18th, 1921.

Black-headed Grosbeak (*Zamelodia melanocephala*). Presented by Mr. Arthur Trill, Errington, B.C., June 20th, 1921.

Cooper's Hawk (*Accipiter cooperii*). Two specimens presented by Mr. R. Gidley, Victoria, B.C., July 8th, 1921.

Western Robin (albino) (*Merula migratoria propinqua*). Presented by Mr. G. H. Cavin, Cedar, B.C., November 11th, 1921.

Snowy Owl (*Nyctea nyctea*) killed at Victoria, B.C. Two specimens presented by Provincial Police Department.

White-winged Crossbill (*Loxia leucoptera*). Presented by Mr. Dennis Ashby, Duncan, B.C., January 6th, 1922.

Lumpfish (*Eumicrotremus orbis*). Presented by Mr. Theodore Sebring, Victoria, B.C., April 1st, 1921.

Broad-finned Cod (*Zaniolepis latipinnis*) caught near Crofton, B.C. Presented by Mr. H. F. Prevost, Duncan, B.C., June 20th, 1921.

Crab (*Phyllolithodes papillosus*). Presented by Mr. A. McMurtrie, Ladysmith, B.C., September, 1921.

Chiton (*Cryptochiton Stelleri*). Presented by Mr. John Ead, Fanny Bay, B.C., October 3rd, 1921.

Blue-tailed Lizard (*Eumeces skiltonianus*) found at North Shore, Kootenay Lake, September, 1921. Presented by Master J. G. H. Dicken Spurway.

Blue-tailed Lizard (*Eumeces skiltonianus*) found at Edgewood, B.C. Presented by Mr. C. P. Coates, October, 1921.

Indian arrow-points presented by Mr. O. H. Brown, Victoria, B.C.

Indian spear-point and chisel presented by Mr. Joseph Tracey, Gordon Head, B.C.

Fossil shell presented by Mr. Nelson Smith, Nanaimo, B.C., August 1st, 1921.

Fossil shells and leaf presented by Mr. Pete Pasqual, Nanaimo, B.C., February 28th, 1921.

Black Bear skull found at Namu, B.C. Presented by Mr. W. A. Newcombe, September, 1921.

Marten-skin presented by Mr. J. W. Cockle, Kaslo, B.C., April 7th, 1921.

Black Squirrel skin presented by Mr. Carl Wihksne, South Fork, Bridge River, Lilloet, B.C., June 10th, 1921. This mammal is a melanistic form of the Red Squirrel (*Sciurus hudsonicus*).

Black-tailed Deer (albino) (*Odocoileus columbianus columbianus*) killed at Chilliwack by E. S. Thornton, November 16th, 1921.

Collection of *Sciurus*, *Evotomys*, and *Peromyscus*, collected at Bella Coola and presented by Mr. Harlan Smith, July 30th, 1921.

Entomological collection presented by Mr. Bryant, Ladysmith, B.C.

Collections of plants presented by several persons, of which further mention is made in the Botanical section.

PUBLICATIONS OF OTHER INSTITUTIONS.

(Alphabetically arranged.)

Art Institute of Chicago, Illinois	1
Art, Historical and Scientific Journal, Vancouver, B.C.	1
Archæological Society of Ontario, Toronto, Ont.	1
Bernice Pauahi Bishop Museum, Honolulu, Hawaii	12
Boston Society of Natural History, Boston, Mass.	1
Bristol Museum and Art Gallery, Bristol, England	1
Brooklyn Institute of Arts and Sciences, Brooklyn, N.Y.	1
California Academy of Sciences, San Francisco, Cal.	13
California University, Berkeley, Cal	6
Carried forward	37

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Brought forward	37
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Carnegie Museum, Pittsburgh, Pa.	2
Charleston Museum, Charleston, S.C.	2
Children's Museum of Boston, Boston, Mass.	1
City Art Museum, St. Louis, Mo.	5
Colorado Museum of Natural History, Denver, Col.	1
Cornell University, Ithaca, N.Y.	6
Dominion Government Publications, Ottawa	51
Detroit Institute of Arts, Detroit, Mich.	7
Field Museum, Chicago, Ill.	1
Gray Herbarium, Harvard University	5
Illinois State Natural History Survey, Urbana, Ill.	5
Instituto General y Tecnico de Valencia, Valencia, Spain	1
John Crerar Library, Chicago, Ill.	1
Library of Congress, Washington, D.C.	2
Manchester Museum, Manchester, England	1
Minneapolis Institute of Arts, Minn.	8
Minnesota University, Minn.	4
Museum American Indian Heye Foundation	1
Museum of Fine Arts, Boston, Mass.	4
National Museum, Philadelphia, Pa.	1
Newark Museum Association, Newark, N.J.	3
Nebraska University, Lincoln, Neb.	2
New York Botanical Garden, N.Y.	2
Ohio Agricultural Experimental Station, Wooster, Ohio	6
Oklahoma University, Norman, Okla.	1
Peabody Museum, Salem, Mass.	1
Peabody Museum, Yale University, New Haven, Conn.	22
Pennsylvania Museum and University	7
Philadelphia Academy of Natural Sciences, Pa.	2
Roger Williams Park Museum, Providence, R.I.	7
Royal Scottish Museum, Edinburgh, Scotland	1
Smithsonian Institution, Washington, D.C.	32
Staten Island Institute, New Brighton, N.Y.	3
Sydney Museum, Australia	9
United States Department of Agriculture, Washington, D.C.	6
University of Washington, Seattle, Wash.	4
Wagner Free Institute of Science, Philadelphia, Pa.	2
Zoological Society, New York, N.Y.	2
Zoological Society, Philadelphia, Pa.	1
	260

BOTANY.

By W. R. Carter.

Considerable activity has been prevalent among collectors in several portions of the Province, and from these sources much desirable material has been added to the collection in the Herbarium of the Provincial Museum.

Our gratitude must be extended to the following gentlemen for their kindness in contributing a large amount of material which not only has added to the collection, but has increased our knowledge of the distribution of a number of plants, or, in other words, their known range has been extended: Dr. C. F. Newcombe; Mr. W. B. Anderson; Mr. W. A. Newcombe; Professor J. K. Henry; Mr. T. P. Mackenzie and Mr. G. V. Copley, of the Grazing Commission; Mr. J. R. Anderson; Mr. A. R. Sherwood; Mr. Dennis Ashby; and Dr. M. O. Malte.

Mr. E. B. Webster, of Port Angeles, Washington, very kindly donated specimens of *Senecio Websteri* n. sp., a rare plant which he collected on the talus-slopes of Mount Angeles, Clallam

County, Washington. These specimens are very desirable, as there is a possibility that this and some of the other plants at present only known to the Olympic Range may eventually be found on some of the higher mountains on the west coast of Vancouver Island.

Mr. George Fraser, of Ucluelet, Vancouver Island, presented a number of specimens of hybridization, chiefly among *Rubus*, upon which he has been working since 1912, in order to find out if he could throw any light on the parentage of the loganberry. He is to be congratulated for his marked strides of success in producing many interesting variations between well-known cultivated varieties and our native species, which should prove of much scientific value to horticulturists; the following list represents the results of his research:—

English raspberry x *Rubus nutkanus.*
Rubus nutkanus x English raspberry.
English raspberry x *Rubus spectabilis.*
English raspberry x *Rubus leucodermis.*
Rubus macropetalus x English raspberry.
Rubus macropetalus x Mongrel raspberry, the result of crossing *Rubus spectabilis* with raspberry.
Rubus macropetalus x Erie blackberry (*Rubus canadensis*).
Rubus macropetalus x Lucretia dewberry (*Rubus villirus* var.).
Rubus macropetalus x Loganberry.
Upright seedling from *Rubus macropetalus* x Loganberry.
Loganberry x English raspberry (infertile).
Loganberry x *Rubus nutkanus* (fertile).
Loganberry x *Rubus nutkanus* (infertile).
Loganberry x *Rubus spectabilis* (fertile).
Loganberry x *Rubus laciniatus* (infertile).

In the above list Mr. Fraser states the first named is the seed parent.

Another consignment of hybridization received from Mr. Fraser included the following plants:—

Rubus parviflorus x *R. odoratus.*
Fruit and foliage of *Rubus ursinus* x Loganberry.
Fruit of *Pyrus diversifolia* x cultivated variety of P. *malus.*
Myosotis laxa x *Myosotis palustris semperflorens.*
Lonicera Periclymeum x *Lonicera ciliosa* (fertile).
Knight's hybrid *ribes.*
Campanula rotundifolia var.
Aster?

Mr. Fraser states the following plants, of which he also very kindly donated specimens, with the exception of *Vaccinium macrocarpum* Ait., have established themselves by seeding unassisted on ground which has been cleared and burned but never has been cultivated:—

Rhododendron ponticum.
Calluna vulgaris.
Calluna vulgaris alporti.
Calluna vulgaris alba.
Daböecia polifolia.
Daböecia polifolia alba.
Erica vagans.
Erica vagans var. *alba.*
Spiræa Bumalda.
Pernethya mucronata.
Vaccinium macrocarpum.

It will be interesting to note whether any of these plants later become distributed and established throughout the Ucluelet District.

There has been an increase in the number of visitors seeking information about our native flora, and a large increase over previous years in the quantity of plants sent in for identification, Mr. T. P. Mackenzie and Mr. G. V. Copley, of the Grazing Commission, sending in approximately 300 specimens, many of them plants from the dry interior of the Province, and wherever possible duplicate specimens have been donated for the Herbarium collection.

Among these plants, the following are of special interest:—

Agropyron dasystachyum (Hook.) Scribn.
Bromus Porteri (Coult.) Nash.
Danthonia intermedia Vasey.
Elymus dasystachys Trin.
Panicum capillare L.
Poa brachyglossa Piper.
Poa nervosa (Hook.) Vasey.
Poa Sandbergii Vasey.

Sporobolus asperifolius Thurber.
Stipa comata Trin. & Rupr.
Carex? atrata L. var. *ovata* Boot.
Carex sychnocephala Carey.
Juncus Mertensianus Bong.
Luzula spicata (L.) DC.
Eriogonum niveum Dougl.
Polygonum acre leptostachyum Meisn.
Polygonum Douglasii Greene var. *montanum* Small.
Atriplex argentea Nutt.
Chenopodium leptophyllum Nutt.
Monolepis Nuttalliana (Schultes) Engelm.
Salicornia europoea L.
Suæda depressa (Pursh.) Wats.
Amaranthus paniculatus L.
Silene Douglasii Hook. var. *multicaulis* Rob.
Sisymbrium canescens Nutt.
Asclepias speciosa Torr.
Mertensia paniculata Don.
Salvia pratensis L.
Chœnactis Douglasii H. & A.
Iva xanthiifolia Nutt.

Mr. W. B. Anderson, as is his usual custom, brought in a number of plants collected over a large portion of the Province, including Prince Rupert, Anahim, and Fort George in the north, the Columbia River Valley in the east, Southern Okanagan to the south, Chilliwack and Lytton to the west, besides a small series from Vancouver Island.

Specimens mounted and placed in the collection include:—

Sisyrinchium Macounii Bickn.
Urtica urens L.
Silene Douglasii Hook. var. *Macounii* Rob.
Arabis? Macounii S. Wats.
Sisymbrium linifolium Nutt.
Thelypodium laciniatum Endl.
Saxifraga nivalis L.
Astragalus Purshii Dougl.
Geranium Robertianum L.
Mimulus peduncularis Dougl.
Pentstemon Richardsonii Dougl.
Cynoglossum? grande Dougl.
Antennaria? aprica Greene.
Anthemis tinctoria L.
Crepis occidentalis Nutt.
Gnaphalium Macounii Greene.
Helianthus Nuttallii T. & G.

Besides these, there are a number of Compositæ as yet undetermined.

The following additions to the Herbarium are also recorded:—

Aristida purpurea Nutt; *Hemicarpha aristulata* (Coville) Smyth. Presented by Dr. M. O. Malte.

Orthocarpus purpurascens Benth. Presented by Dr. C. F. Newcombe.

Phyllospadix Scouleri Hook.; *Cakile edulenta* Hook. Presented by Mr. W. A. Newcombe. Collected on the west coast of Calvert Island, extending their previously known range.

Portulaca oleracea L. Presented by Mr. A. R. Sherwood. This plant appears to be spreading in the vicinity of Victoria and may become a troublesome weed.

An *Epipactes* as yet unidentified, presented by Mr. W. Burton.

Iris (introduced), not yet identified; *Lupinus micranthus* Dougl., a pink flowering form; *Plantago lanceolata* L., an uncommon form. Presented by Professor J. K. Henry.

Poa bulbosa L.; *Euphorbia glyptosperma* Engelm.; *Zizia cordifolia* (Walt.) DC. Presented by Mr. W. R. Carter.

Allium sp. *Moly* L. This *Allium* with its handsome yellow flowers and strong scent has escaped from cultivation and is now spreading and growing in a wild state in portions of the Cowichan District. Presented by Mr. Dennis Ashby.

The following are additions to our Canadian and Provincial flora:—

Caphalanthera oregana Reich. A single specimen collected and retained by Mr. R. Glendenning at Agassiz, July, 1918, and identified by Professor C. V. Piper, of Washington, D.C. New to Canada.

Hemicarpha aristulata (Coville) Smith. Collected at Cadboro Bay, V.I., July 7th, 1921, by Dr. M. O. Malte. New to Canada.

Silene Douglasii Hook. var. *Macounii* Rob. Collected at Comox, V.I., by Mr. W. B. Anderson. New to Vancouver Island.

Poa bulbosa L. Collected Beacon Hill Park, Victoria, B.C., May 17th, 1921, and identified by Mrs. Agnes Chase, Washington, D.C.

Euphorbia glyptosperma Engelm. Fitzgerald, V.I., August 7th, 1921; *Zizia cordifolia* (Walt.) DC., Fitzgerald, V.I., July 31st, 1921. Collected by Mr. W. R. Carter. New to Vancouver Island.

Other plants identified included a mounted series of over 100 species from South Park School. These specimens, while not of full herbarium size, were exceedingly well prepared and reflect great credit on those pupils and teachers responsible for the work. A large series of unmounted plants were identified for Happy Valley, Kingston Street, and other schools.

Again this past season Miss M. Lawson, of the *Colonist* staff, undertook, for the benefit of the children, the task of editing a Flower Calendar in the Sunday edition of the *Daily Colonist* of plants collected by children from various schools and districts. A large number of plants were identified weekly, and a marked improvement in the condition of specimens sent in was noticeable over last year, especially among a few of those who were consistent in sending a series in every week.

Mrs. Agnes Chase, Acting Systematic Agrostologist of the Bureau of Plant Industry, United States Department of Agriculture, Washington, D.C., very kindly examined and determined our collection of grasses, which is now revised under present nomenclature. This revision has added several species to the list of Vancouver Island flora.

In the latter part of the summer a "Preliminary Catalogue of the Flora of Vancouver and Queen Charlotte Islands" was received from the hands of the printers, and copies have been distributed to most of the scientific institutes and colleges in America and other countries, and up to the present time we have received numerous applications for copies from teachers and others interested in botany, residing in many portions of this Province.

"The following list of plants are supplementary additions to "The Flora of Vancouver and Queen Charlotte Islands, 1921" (introduced plants being printed in italics in conformity with the printing of the Check-list) :—

Lycopodium annotinum L. Mountains, V.I.

Potamogeton amplifolius Tuckerm. Henry's "Flora of Southern British Columbia."

Agrostis hyemalis var. geminata (Trin.) Hitchc. Mount Arrowsmith, V.I.

Agrostis idahoënsis Nash. Victoria, Macoun.

Agrostis palustris Hitchc. Sidney, V.I., Macoun.

Danthonia Macounii Hitchc. Macoun, No. 78823. Mount Benson, V.I.

Elymus arenarius compositus (Abromsit) St. John. Beacon Hill Park, Victoria, J. R. Anderson.

Glyceria scabra Malte sp nov. Macoun's List, 1918.

Pucinellia nutkænsis (Presl.) Fern & Weath. Sidney, V.I., Macoun.

Pucinellia nuttalliana (Schult.) Hitchc. Nanaimo, V.I., Macoun.

Poa bulbosa L. Beacon Hill Park, Victoria, W. R. Carter.

Stipa minor (Vasey) Scribn. Macoun's List, 1918.

Carex sterilis cephalentha Bailey. Port Renfrew, Rosendahl.

Juncus columbianus Coville. Macoun's List, 1918.

Hemicarpha aristulata (Coville) Smyth. Cadboro Bay, V.I., Malte.

Polygonum erectum L. Macoun's List, 1918.

Chenopodium leptophyllum Nutt. Macoun's List, 1918.

Sagina saginoides (L.) Brit. Nanaimo, Hardy Bay, V.I.

Silene Douglasii var. Macounii Rob. Comox, V.I., W. B. Anderson.

Lepidium oxycarpum T. & G. Cadboro Bay, V.I., Macoun.

Lathyrus nevadensis S. Wats. Cowichan Lake, V.I., J. R. Anderson.

Euphorbia glyptosperma Engelm. Fitzgerald, V.I., W. R. Carter.

Callitriche palustris L. Port Renfrew, V.I., Rosendahl.

Zizia cordata (Walt.) DC. Fitzgerald, V.I., W. R. Carter.

Plagiobothrys tenellus Gray. Generally distributed, southern end of Vancouver Island.

Castilleja acuminata (Pursh.) Spreng. Port Renfrew, V.I., Rosendahl.

Orthocarpus purpurascens Benth. Mount Finlayson, V.I., Dr. C. F. Newcombe.

Galium cymosum Wiegand. Henderson Lake, V.I., W. A. Newcombe. Cowichan Lake, Thetis Lake.

Centaurea vo-chinensis Bernh. Victoria, V.I., J. R. Anderson.

Cotula australis Hook. Nanaimo, V.I., Macoun.

Solidago caurina Piper. Prospect Lake, V.I., J. R. Anderson.

Solidago lanceolata L. Ucluelet, V.I., Macoun.

ENTOMOLOGY.

By E. H. Blackmore, F.E.S.

Collecting during the past season has not been at all good, although, taken on the whole, it has been somewhat better than the three preceding years.

We had an exceedingly wet winter, which continued, with the exception of a few short dry spells, until late in the spring. Reports from various parts of the Province all speak of poor collecting weather. However, a number of rare and uncommon species were obtained by various collectors, which will be noted under their respective localities.

Early in the year Mr. Theodore Bryant, of Ladysmith, offered to donate to the Provincial Museum a large number of his duplicate Lepidoptera. Arrangements were made whereby the writer was enabled to visit Mr. Bryant in the latter part of May and thereby enabled to select the most desirable of the material offered. In addition, Mr. Bryant kindly loaned the writer his entire collection of Microlepidoptera to work over during the winter months. We are especially glad to have the use of this collection, as it contains most of the identical specimens recorded from Wellington in the 1906 Check-list of British Columbia Lepidoptera; as was mentioned in last year's Museum report, page 23, the large majority of species listed in this group were either from Mr. Cockle, of Kaslo (168), or Mr. Bryant, of Wellington (94). I hope to start work on this collection early in the New Year, as the greater number are simply pinned and need relaxing and mounting. Many of the species are erroneously named and many need verification.

Mr. A. W. Hanham, of Duncan, B.C., has also generously placed at my disposal a large number of unidentified specimens in this group.

The European satin-moth (*Stilpnotis salicis* Linn.) has spread rather rapidly and has been reported from several localities other than New Westminster, where it was first noticed. It was found in Vancouver occupying an area several blocks square. Mr. L. E. Marmont, of Maillardville, reported a heavy infestation in his district, and it has also been found at Cowichan Bay, on Vancouver Island. I have recently identified specimens of this species for Mr. J. F. Clarke, who took them at Bellingham, Wash. It is to be regretted that it is spreading so rapidly, as it is likely to become a serious pest to our native poplars.

British Columbia Insects new to Science.

Owing to the strike in the printing trade in Eastern Canada early in the spring a number of entomological magazines were held up, with the result that even now many of them are from two to three months behind in their issues. Consequently, we can only list those species the descriptions of which have appeared up to the time of writing this article (December 31st). Any species that may be described in the belated issues will be included in next year's Provincial Museum Report. Up to date there have been forty-five insects from British Columbia described as new to science during the present year. They include eight species of Lepidoptera, one species of Hymenoptera (parasitic), thirty-two species of Diptera, and four species of Hemiptera.

Lepidoptera.

Of the eight species of Lepidoptera, one belongs to the Lycaenidæ, one to the Noctuidæ, one to the Lymantriidæ, four to the Pyralidæ, and one to the Pterophoridæ. They are as follows:—

Lycænidæ (Theclinæ).

Strymon melinus race *atrofasciata* McDunnough. Described in the Can. Ent., Vol. 53, page 47, Feb., 1921, from specimens taken at Wellington, B.C. (Taylor); Duncan, B.C. (Livingstone); Royal Oak, B.C. (Treherne); and Victoria, B.C. (Cameron). The above race differs from typical *melinus* in its deep steely-grey ground colour and the heavy black spotting on the underside. The lack of orange margin to spots alluded to in the description is not a constant character, as out of a long series in my own collection there are several which have the orange margins strongly pronounced. Dr. McDunnough was of the opinion that this race was confined to Vancouver Island, but I have specimens from many points on the Mainland which are typical of this new race, and it can safely be assumed that *atrofasciata* occurs throughout the whole of Southern British Columbia. It is double-brooded, occurring in May and again in July.

Noctuidæ.

Anomogyna partita McDunnough. Described in the Can. Ent., Vol. 53, page 179, Aug., 1921, from five specimens. The type taken at Banff, Alta. (Wallis); two paratypes from Kaslo, B.C. (Cockle); and two paratypes from Nordegg, Alta. (McDunnough).

Lymantriidæ.

Hemerocampa pseudotsugata McDunnough. Described in the Can. Ent., Vol. 53, page 53, March, 1921. This is the tussock-moth which I had previously determined (*vide* Rep. Prov. Mus., 1918, page 12) as *Hemerocampa vetusta gulosa* Hy. Edw. It was originally discovered by Mr. W. B. Anderson at Chase, B.C., who found it doing considerable damage to Douglas fir. Upon the receipt of a number of egg-masses from Mr. Anderson in the spring of 1920, Dr. McDunnough was enabled to breed it from the egg to the adult. From his observations on the larval stages he came to the conclusion that the species was distinct and undescribed.

Pyralidæ (Scopariinæ).

Scoparia basalis race *pacificalis* Dyar. Described in Ins. Ins. Mens., Vol. IX., page 66, April–June, 1921, from four specimens taken at Victoria, B.C. (Blackmore); Mount Newton, near Saanichton, B.C. (Blackmore); and Grayland, Wash.

Scoparia commortalis Dyar. Described in Ins. Ins. Mens., Vol. IX., page 67, April–June, 1921, from three specimens taken by the writer at Victoria, B.C. This species is close to *rectilinea* Zeller, but is much browner and the paler areas more contrasting.

Pyralidæ (Crambinæ).

Crambus tutillus McDunnough. Described in Can. Ent., Vol. 53, page 160, July, 1921, from six specimens taken at Victoria, B.C. The type and four paratypes were taken by W. Downes; the other paratype was taken by the writer, mention of which was accidentally omitted from the original description. A note on this species will be found under the heading of "Illustrated Lepidoptera," together with a figure of the paratype on Plate IV.

Pyralidæ (Phycitinæ).

Pyla blackmorella Dyar. Described Ins. Ins. Mens., page 68, April–June, 1921, from two specimens taken by the writer on Mount Tzouhalem, near Duncan, B.C., on June 24th, 1913. A figure of the paratype will be found on Plate IV. and further remarks on the species under the heading of "Illustrated Lepidoptera."

Pterophoridæ.

Platyptilia albertæ B. & L. Described by Barnes and Lindsey in Cont. Lep. No. Amer., Vol. IV., No. 4, page 346, from four specimens. Holotype female, Laggan, Alta.; allotype male, Mount Cheam, B.C. (R. V. Harvey); and two paratype females, Laggan, Alta., and Olympic Mountains, Wash.

HYMENOPTERA (PARASITIC).

Ichneumonidæ.

Myersia grandis Cushman. Described in Proc. Ent. Soc. Wash., Vol. 23, page 110, May, 1921, from one female taken June 5th by Dr. H. G. Dyar at Kaslo, B.C. This specimen was found by Mr. Cushman among some undetermined Ichneumonidæ in the U.S. National Museum, and was probably taken by Dr. Dyar when he made his large collection of Lepidoptera at Kaslo, B.C., in 1903.

DIPTERA.

Mycetophilidæ (Fungus-gnats).

In the Proc. Brit. Col. Ent. Socy., Feb., 1920 (issued Nov., 1921), page 16 *et seq.*, Mr. R S. Sherman described the following sixteen species of this family:—

Mycoma mutabilis. Savary Island, April.
Platyura intermedia. Savary Island, July.
Dziedzickia vernalis. Vancouver, May.
Dziedzickia rutila. Vancouver, November.

Dziedzickia johannseni. Savary Island, April.
Dziedzickia columbiana. Vancouver, May.
Dziedzickia occidentalis. Savary Island, April.
Rhymosia prolixa. Savary Island, July.
Rhymosia facceta. Vancouver, February.
Rhymosia seminigra. Vancouver; Savary Island, March and October.
Rhymosia pectinata. Savary Island, April.
Rhymosia brevicornis. Vancouver, April.
Tetragoneura atra. Vancouver, May and June.
Tetragoneura marceda. Savary Island; Vancouver, April and May.
Tetragoneura fallax. Savary Island; Vancouver, April, May, and December.
Tetragoneura arcuata. Vancouver, May and June.

Mr. Sherman has made a special study of this family for a number of years and has greatly added to our knowledge of the species occurring within the Province.

These small flies or fungus-gnats, as they are called, resemble mosquitoes or midges to a great degree, but can at once be distinguished by the antennæ not being furnished with whorls of hair.

The abdomen of the male ends in a forceps-like process and in the female in a pointed ovipositor. The larvæ feed in fungi and in decaying vegetation and are not injurious, except when they attack cultivated mushrooms.

Tabanidæ (Horse-flies).

In a recent "Revision of the Canadian species of the *affinis* group of the genus *Tabanus*" by Dr. J. McDunnough, Can. Ent., Vol. 53, page 13 *et seq.*, he has recorded four new species, three of which are described from material wholly or partly collected in British Columbia.

Tabanus trepidus McD. This species occurs throughout the Dominion, the type lot containing specimens taken in Ontario; New Brunswick; Nova Scotia; Quebec; Manitoba; and Peachland, B.C.

Tabanus nudus McD. This species also has the same general range, specimens having been taken in Ontario; New Brunswick; Manitoba; Saskatchewan; and Mount Lehman (Lower Fraser Valley), B.C.

Tabanus atrobasis McD. The type material of this species is entirely confined to British Columbia, although Dr. McDunnough states that it extends south into Oregon. The holotype is from Mount Lehman, B.C. (S. Hadwen), and the paratypes are from Victoria, Royal Oak, Duncan, and Courtenay.

Bombyliidæ (Bee-flies).

Calopelta fallax Greene. Described in Proc. Ent. Soc. Wash., Vol. 23, page 23, Jan., 1921, from five specimens. Holotype, allotype, and one female paratype from Colorado, and one male and one female paratype from Royal Oak, B.C., taken on May 19th, 1917, by R. C. Treherne. *Calopelta* is also a new genus erected by Mr. Greene for the reception of this new species; it differs from the genus *Ploas*, which it most nearly resembles, by having only two submarginal cells in the wing instead of three, a feature which was pointed out by Dr. McDunnough.

Syrphidæ (Flower-flies).

Sphærophoria cranbrookensis Curran. Described in Can. Ent., Vol. 53, page 173, Aug., 1921, from a single male specimen taken by Mr. C. Garrett at Cranbrook, B.C., on May 25th, 1919.

Helomyzidæ.

In an article entitled "Notes on Helomyzidæ and Descriptions of New Species," which appeared in Ins. Ins. Mens., Vol. IX., page 119 *et seq.*, July–Sept., 1921, Mr. C. B. D. Garrett describes eleven new species of this family, ten of which are from British Columbia. They are as follows:—

Leria aldrichi. Cranbrook, March.
Barbastoma barbatus. Sheep Creek, October.
Postleria fuscolinea. Cranbrook; Michel, May–June–August.
Amœbaleria scutellata. Cranbrook, May.
Amœbaleria gigas. Cranbrook; Michel, March to August.

Morpholeria melaneura. Cranbrook, April–May–October.
Pseudoleria pectinerata. Cranbrook, June.
Œcothea canadensis. Cranbrook; Michel, April–July.
Acantholeria œdiemus. Cranbrook; Michel, April–August.
Acantholeria abnormalis. Michel, July.

A new scheme of classification for this family has been proposed by Mr. Garrett, based chiefly on the length of the foremost fronto-orbital bristle, and six new genera have been erected, viz.: *Barbastoma, Postleria, Amœbalaria, Morpholeria, Pseudoleria,* and *Acantholeria.*

The species of this family are small dark-coloured flies looking something like dung-flies. They are found in damp shady places and fly in the twilight. The larvæ feed in fungi, decaying wood, and the dung of small animals, such as dogs, rabbits, and bats.

HEMIPTERA.

The following four species were described by Dr. H. M. Parshley in the Proc. Brit. Col. Ent. Soc., Feb., 1921, page 16 *et seq.*:—

Tingidæ.

Acalypta modesta. From three specimens taken at Royal Oak, B.C., by R. C. Treherne on May 14th, 1917.

Miridæ.

Daceria formicina. This species was described from several specimens taken by Mr. W. Downes in the Saanich District, B.C., and at Shawnigan Lake, B.C., in July and August, 1918.

Saldidæ.

Saldula comata. Holotype male and allotype female taken at Beaver Lake, Saanich District, B.C., by W. Downes, June 17th, 1919, and paratype female at Vernon, B.C. (Downes), September 26th, 1918.

Saldula nigrita. Described from specimens taken by Mr. Downes at Duncan, B.C., on September 17th, 1919.

LEPIDOPTERA NOT PREVIOUSLY RECORDED FROM BRITISH COLUMBIA.

The following annotated list contains those species of Lepidoptera which have been taken during the past two seasons and of which we have had no previous record. It does not include the Microlepidoptera, which are treated of under a separate heading, neither does it include the names of species recently determined as new to the Province, but which have stood as uniques in the cabinets of various collectors for a number of years. The numbers preceding the names are the same as those contained in Barnes & McDunnough's Check-list of North American Lepidoptera, 1917.

Noctuidæ.

1226. *Orosagrotis incognita* Sm. Mount McLean, near Lillooet, B.C., August 21st, 1920 (A. W. Hanham). Further remarks on this species will be found under the heading of "Illustrated Lepidoptera."

1256. *Euxoa floramina* Sm. A single specimen taken by A. W. Phair at Lillooet, B.C., on September 5th, has been determined by Dr. A. W. Lindsey as agreeing with specimens of *floramina* Sm. in the Barnes collection.

1274. *Euxoa rufula* Sm. Mount McLean, B.C., August 22nd, 1920. (*See* "Illustrated Lepidoptera.")

1288. *Euxoa exculta* Sm. A single specimen taken at Vavenby, B.C., by T. A. Moilliet on August 26th has been determined as this species by Dr. H. G. Dyar, who compared it with Smith's unique type. In Proc. U.S. N.M., Vol. XXII., page 424, Smith gives "North-west British Columbia" as the locality for the single male from which the species was described. It is more likely that "North-west Territory" was meant, as most of Smith's species described from this general locality have turned out to be from Northern Alberta. I believe that this Vavenby specimen is the first authentic record that we have of this species from British Columbia.

1364A. *Euxoa excellens* race *infelix* Sm. Fort Steele, B.C., August 15th, 1921 (W. B. Anderson). (*See* "Illustrated Lepidoptera.")

1388. *Rhizagrotis flavicollis* Sm. Vavenby, B.C., August 26th, 1921 (T. A. Moilliet). This species is listed in the 1906 B.C. Check-list from Wellington and Kaslo, but all the specimens that I have seen under this name (about fifty from a dozen different localities) have been *Euxoa ridingsiana* Grt. The two species are very much alike superficially, but *flavicollis* has a more yellow costa and the collar is yellow also. I have the species from Nordegg, Alta., and the Vavenby specimen agrees with these.

1584. *Lampra* (*Rhynchagrotis*) *nefascia* Sm. Goldstream, B.C., September 6th, 1920 (E. H. Blackmore). (*See* "Illustrated Lepidoptera.")

1642. *Anarta hampa* Sm. A single specimen taken on Mount McLean at 7,500 feet altitude by A. W. Hanham on August 21st, 1920.

2201a. *Sympistis zetterstedti* race *labradoris* Staud. Mount McLean, B.C., August 21st, 1921 (A. W. Hanham). (*See* "Illustrated Lepidoptera.")

2275a. *Trachea inordinata* race *montana* Sm. Chilcotin, B.C., May 30th, 1920 (E. R. Buckell). (*See* "Illustrated Lepidoptera.")

2364. *Tæniosea discivaria* Walk. Vavenby, B.C., July 18th, 1921 (T. A. Moilliet). (*See* "Illustrated Lepidoptera.")

2470. *Acronycta radcliffei* Harv. Quamichan Lake, near Duncan, B.C., June, 1921 (G. O. Day). (*See* "Illustrated Lepidoptera.")

2965. *Tarachidia semiflavana* Gue. Taken by J. W. Wynne at Enderby, B.C.

3222. *Syngrapha alticola* Wlk. A single specimen taken on Mount McLean, B.C., by A. W. Hanham on August 22nd, 1921. This was at one time believed to be a synonym of *devergens* Hubner, but is now regarded as a distinct species.

3509. *Zanclognatha jacchusalis* Wlk. Taken by T. A. Moilliet at Vavenby, B.C., on July 18th, 1921.

Geometridæ.

4009e. *Hydriomena nubilofasciata* race *vulnerata* Swett. Sluggett's, B.C., March 1st, 1921 (W. Downes). (*See* "Illustrated Lepidoptera.")

4129. *Nasusina leucata* Hulst. A single specimen taken by A. W. Phair at Lillooet, B.C., on July 16th, 1920.

4316-1. *Drepanulatrix secundaria* B. & McD. Kaslo, B.C., July, 1920 (J. W. Cockle). (*See* "Illustrated Lepidoptera.")

4453. *Dysmigia loricaria Evers.* Vavenby, B.C., July 18th, 1921 (T. A. Moilliet). (*See* "Illustrated Lepidoptera.")

4467. *Caripeta angustiorata* Wlk. Several specimens taken at Kaslo, B.C., by J. W. Cockle in 1920. This species is an inhabitant of the Atlantic States, but is recorded from Blairmore, Alta.

Rare and Uncommon Lepidoptera taken in British Columbia during 1921.

Victoria.—Mr. Martin Brinkman took the following noctuids during the present season, all of which are new records for Victoria: *Graptolitha torrida* Sm.; *Acronycta funeralis* G. & R.; and *Autographa speciosa* Ottol. They were all taken "at rest" on electric-light poles. He also took a specimen of that rather rare geometer *Gabriola dyari* Tayl.

Master Lewis Clark, who has recently become an enthusiastic collector, captured a fine specimen of *Autographa octoscripta* Grt. This is the first record of this species for Vancouver Island. It is a very rare species in British Columbia, as only three specimens have been recorded to my knowledge. He also bred from a pupa found in his father's garden a female specimen of that very rare geometer *Cleora excelsaria* Streck. It emerged on June 22nd. It is four years since I have had a record of this species, when I took a specimen at Goldstream on June 4th, 1917. A figure of this specimen was given in Rep. Prov. Mus., 1917, Plate II.

Mr. W. B. Anderson took specimens of *Polia restora* Sm. and *Septis alia* race *rorulenta* Sm. The former species is apparently increasing, as it has been taken by several local collectors during the past two or three years. It was at one time comparatively rare in collections.

Mr. W. R. Carter, who has collected assiduously during the season, has captured several very interesting species, amongst them being a nice series of *Ipimorpha nanaimo* Barnes. This species has been a comparative rarity for many years, but from certain conclusions reached last year an exhaustive search of certain localities resulted in an increased number of specimens being taken this season. As the specimens taken have always been in the vicinity of Lombardy

poplar, I am inclined to the belief that this is its food-plant. There are two distinct colour forms of this species, the predominating form being of an even light-buff colour and the other is of a light olivaceous shade. Mr. Carter also took a couple of specimens of *Cerma cuerva* Barnes, both "at rest." This small noctuid seems to be of very retiring habits, as very few specimens have been captured. I have only taken two in eleven years' collecting in this vicinity. It was described from Victoria in 1907 (Can. Ent., Vol. 39, page 10), and with the exception of a couple of specimens taken by Mr. Cockle at Kaslo, I have not seen it from any other locality. A figure of this species was given in the Rep. Prov. Mus., 1919, Plate II.

Showing the extreme mildness of the Victoria winter climate, Mr. Carter took a freshly emerged specimen of *Coniodes plumogeraria* Hulst. on January 6th of this year. This is about two months earlier than it normally appears. A single specimen of *Erannis vancouverensis* Hulst. was taken on December 7th. A nice series of the wingless females of both *Paraptera danbyi* Hulst. and *Rachela occidentalis* Hulst. were taken by Mrs. Carter in the early part of December.

Goldstream.—The writer spent part of his vacation as well as a number of week-ends in this locality. The collection of "Micros" was the principal object in view, but several interesting species of other families were also taken. The most desirable of them being *Polia tacoma* Streck.; this is the first record from Goldstream, the other known localities being Duncan, Kaslo, and Rossland; *Graptolitha ferrealis* Grt., a perfect specimen "at rest"; *Euxoa obeliscoides* Gue.; *Trachea cincfacta* Grt.; *Alypia ridingsi* Grt.; this was the first specimen that I have any record of since I took a solitary individual in the same locality in July, 1912. They have a habit of settling on the railway-track in the hot sunshine of a July afternoon and slowly waving their wings up and down. They are extremely wary and very difficult to capture, as once they are disturbed their flight is exceedingly rapid. Later, Mr. Carter while collecting at Fitzgerald, some 12 miles north of Goldstream on a hillside about 700 feet elevation, saw a number of this species flying about a bed of *Valeriancella congesta* (sea-blush). He managed to net some twelve specimens on three different dates. It is evident that it is a species that frequents higher altitudes and only occasionally comes down to the low levels, thus accounting for its apparent rarity. In the Geometridæ the writer took a single specimen of *Lobophora simsata* Swett.; a single *Spodolepsis substriataria* race *danbyi* Hulst.; this is the first record from this district. It apparently occurs sparingly throughout the whole of Southern British Columbia; a single specimen of *Entephria multivagata* Hulst. in beautiful condition; *Dysstroma ethela* Tayl., a perfect specimen (*see* "Illustrated Lepidoptera"); *Eupithecia mutata* Pears.; this rare species I have also figured on Plate IV.; and two fine male specimens of *Sabulodes cervinaria* Pack.; these were taken "at light" about 11 p.m. on June 2nd and are the first of this species that I have captured.

Fitzgerald.—Mr. Carter, who collected regularly every week-end in this locality, took many desirable species during the season, chief of which were a single *Gortyna pallescens* Sm. (new locality); *Annaphila decia* Grt.; this pretty little noctuid is rather uncommon in the southern part of the Island, though I believe it occurs a little more frequently at Duncan. Amongst the geometers, *Drepanulatrix rectifascia* Hulst. and *D. falcataria* Pack. were the best captures.

Alberni.—Mr. John Redford collected a large number of specimens during the past season, the most interesting of which are the following: *Euxoa costata* Grt. (uncommon); *Agrotis esurialis* Grt. (uncommon); *A. oblata* Morr.; *Euretagrotis perattenta Grt.;* this record extends the known range of this species considerably, my previous records being from Vernon and Chilliwack. It is rare in British Columbia collections. *Trachea indocilis* Walk.; *Papaipema insulidens* Bird, one specimen taken "at light." Previous to this specimen I have only seen the species from Duncan (Day). It is very uncommon, a few odd specimens being taken "at light" occasionally; if its food-plant was known it could doubtless be obtained in greater numbers. It was described from Vancouver Island. *Eosphoropteryx thyathroides* Gue.; two specimens of this very handsome and uncommon noctuid were taken "at light."

Mr. W. R. J. Piggott, a new collector in this district, did considerable collecting "at light" in the late summer and early fall and obtained many good things, amongst them being *Polia lubens* race *glaucopis* Hamp.; *Graptolitha dilatocula* Sm.; *Eumichtis versuta* Sm.; *Eremobia claudens* race *albertina* Hamp. (not common); *Pyrrhia umbra* race *exprimens* Walk. (very uncommon on Vancouver Island); *Melipotis versabilis* Harv. (rather rare on the Island); *Ianassa pallida* Streck.; *Tolype dayi* Blackmore, a single male specimen. The distribution of this species is greater than I at first supposed, as, in addition to the Vancouver Island localities,

I have seen a specimen taken by Mr. Cockle at Kaslo, and I have also found a rather poor male among some papered material taken by the late W. H. Danby at Rossland many years ago.

Maillardville.—Mr. L. E. Marmont, besides collecting a large number of "Micros," took the following desirable species: *Feralia columbiana* Sm.; *Graptolitha thaxteri* Grt., a very uncommon species; *Trachea indocilis* Wlk., a single specimen. This is a good capture as the species seems rather rare in British Columbia collections. The other recorded localities that I know of are Duncan (Day), Alberni (Redford), Kaslo (Cockle), Rossland (Danby), and Upper Columbia River (Dod). It may be more common than supposed, as it is probably confused in collections with *Trachea divesta* Grt., which it very much resembles, especially if the specimens are somewhat worn. *Autographa nicholli* Hamp.; several specimens of this species were taken in May and again in September, thus indicating it to be double-brooded. There is no apparent difference between the two broods. It is also reported from Duncan (Day & Hanham) as having two broods in the season. *Euthyatira pudens* Gn. (peach-blossom moth); a single specimen of this handsome species was taken and a fine specimen of *Drepana bilineata* Pack. was bred ex pupa.

Amongst the Geometridæ, Mr. Marmont captured a nice specimen of that rare species *Cleora albescens* Hulst., and another specimen of *Lygris harveyata* Tayl. A short series of *Æthaloptera anticaria* race *fumata* B. & McD. was taken. The specimens taken by Mr. Marmot are considerably paler than those taken by Mr. Cockle at Kaslo, from which locality the species was described. A most peculiar incident of a butterfly being taken "at light" was related to me by Mr. Marmont. At 11.30 p.m. on the night of August 6th, while out collecting noctuids, he noticed a peculiar-looking moth (?) flying around an electric-light pole. Upon capturing it, it proved to be a specimen of *Phyciodes mylitta* Edw. This is the first instance I have heard of a butterfly being taken in this manner.

Lillooet.—Mr. A. W. Phair, who generally sends in some very desirable material, has not collected as much as usual this season, the cares of an increasing business having prevented him getting into the field as often as he has done in previous years. However, amongst the material sent in was a specimen of *Acronycta mansueta* Sm.; this is the first authentic specimen of this species that I have seen. It agrees perfectly with the description and figure (Proc. U.S.N.M., Vol. 21, page 100, and Plate XII., Fig. 7). Dyar in his "Kootenai List" records one specimen from Kaslo (Cockle), but a specimen sent to me by Mr. Cockle as this species is *A. grisea* race *revelleta* Sm.; *Acronycta strigulata* Sm., a rather worn specimen. This species was figured in Rep. Prov. Mus., 1920, Plate I.

Amongst the geometers was a specimen of *Dysstroma formosa* Hulst., a rather rare species. I have seen one other specimen previously from the same locality and one from Vavenby. During the second week of August Messrs. Day and Hanham spent six days camping on Mount McLean at an elevation of 5,000 feet. Several trips were made to an altitude of 7,500 feet, at which elevation many alpine insects were taken. The most noteworthy of the diurnals were: *Eurymus nastes* race *streckeri* Gr.; *Erebia vidleri* Elwes; *Strymon saepium* Bdv.; *Heodes cupreus* Edw.; and *H. heteronea* Bdv. A single specimen of *Euxoa colata* Grt. was taken. This is a most interesting record, as the species must be exceedingly rare. Dyar records one from Sandon, B.C., and a specimen is recorded from Mount Cheam, B.C. Two specimens of *Oncocnemis hayesi* Grt. were captured; this is a new locality for this species, Kaslo being the only previous record. Curiously enough, a specimen of *Autographa alta* Ottol. was taken, to which the same remark applies.

Princeton.—Mr. A. S. Thomson, who was with a surveying party in the mountains in this district, managed to pick up a few specimens, which included *Brenthis charicleа* Schneid and *Euphydryas anicia* D. & H. among the diurnals; *Diacrisia vagans* Bdv. and *Parasemia plantaginis* form *geometrica* Grt. in the arctiids. The only noctuid taken was a rather rubbed specimen of *Zale benesignata* race *largera* Sm. The species was described by Smith (Proc. U.S.N.M., Vol. 35, page 257, 1908) from two specimens, a male from Winnipeg, Man., and a female from Wellington, B.C. (G. W. Taylor). I have no record of any specimen of this species having been captured in the Province since the type was taken until Mr. Thomson secured this specimen, which was kindly identified for me by Dr. J. McDunnough. A single geometer was taken, *Macaria denticulata* race *sexpunctata* Bates. This is rather an uncommon species; it has been recorded from Chilcotin and Penticton.

Chilcotin.—Mr. E. R. Buckell, who has been studying the grasshopper situation in this district for the past two years under the direction of the Provincial Department of Agriculture,

made a small collection of Lepidoptera which contained some very interesting species. The following are worthy of special notice: *Apantesis blakei* race *superba* Stretch; a single, rather faded *Schinia separata* Grt.; this species was recorded for the first time in Rep. Prov. Mus., 1920, page 19, from Spences Bridge, B.C. (Newcombe), as being new to the Province and a figure of it was given on Plate I. *Euxoa quadridentata* race *flutea* Sm.; this is a good record as it is a very rare species in the Province. *Graptolitha petulca* Grt.; this record extends the known range of this species, as it has hitherto only been recorded from the southern part of British Columbia (Vancouver Island to Kaslo); *Septis barnesi* Sm., a worn specimen; *Oligia tensa* Grt. (*see* "Illustrated Lepidoptera"); *Andropolia contacta* Wlk., a rare species, only previously known from Kaslo; and *Euclidimera annexa* Hy. Edw. Amongst the Geometridæ was a nice specimen of *Phasiane hebetata* Hulst. (*see* "Illustrated Lepidoptera"); *Lygris atrifasciata* Hulst., an uncommon species which occurs very sparingly in various localities; and *Platea trilinearia* Pack.; this exceedingly handsome geometer is more widely distributed than is generally supposed. For a number of years a single specimen taken by Mr. E. M. Skinner at Keremeos in May, 1894, was the only known record for British Columbia. During the last three or four years specimens have been recorded from Lillooet (Phair), Penticton (W. B. Anderson), and now from Chilcotin.

Barkerville.—During the middle of August a short time was spent in this district by Mr. Buckell, but owing to the extremely wet weather very few insects were taken; the most interesting amongst the geometers being *Itame brunneata* Thun., one specimen in nice condition being taken. This is a very rare species in British Columbia. I have one other specimen taken by the late R. V. Harvey from Similkameen in July, 1906. In Rep. Can. Arct. Exped., Vol. III., Pt. 1, page 44, Gibson records one specimen from Burwash Creek, Yukon Territory, taken in August, 1914 (D. D. Cairns), rather darker in colour than the Eastern specimens. I have also a single specimen from the Yukon-Alaska boundary taken by Theo. Bryant in 1908. This specimen is also much darker in ground colour than the two British Columbia examples I have mentioned; *Lygris destinata* Moesch (not common); *Eupithicia cretaceata* Pack.; this species has a very wide range in the Province, from Victoria in the south to Atlin in the far north and across the Province to West Kootenay. I am not at all sure but what they embrace one or two well-defined races; and *Xanthorhœ abrasaria* race *congregata* Walk.

Mr. Buckell also collected a short series of *Œncis beani* Elwes on Mount Bowman (7,500 feet) on July 9th. This species has been taken on a number of mountain ranges in the Province and probably occurs on every mountain of over 7,000 feet altitude. Mount Bowman is a high limestone ridge some 20 miles north-west of Clinton.

Enderby.—Mr. Downes has handed us a list of species identified by Dr. J. McDunnough which were taken by Mr. J. Wynne in the vicinity of Enderby. They include several good records, the best of them being *Tarache areli* Streck.; this pretty little noctuid is extremely rare. I have one specimen from Rossland (Danby) and it has been taken at Kaslo by Mr. Cockle. *Syneda ochracea* Behr.; this is another somewhat rare species, odd specimens having been taken at Vaseaux Lake (Treherne), Kaslo (Cockle), and Rossland (Danby). Amongst the geometers, *Trichodesia albovittata* race *tenuifasciata* B. & McD. is the most interesting. It was described (Cont. Lep. No. Amer., Vol., 3, No. 4, page 225) from Spirit Lake, Idaho. It differs from typical *albovittata* in having the white band of the primaries very much reduced in width. I have one specimen from Rossland (Danby).

Vavenby.—This locality is situated about 80 miles north of Kamloops in the valley of the Upper Thompson River. Mr. T. A. Moilliet and his son Ted, who is an enthusiastic collector, sent us a considerable quantity of material during the past season. As we had not previously received any material from this district, we were especially glad to get this, as it has extended our knowledge of the range of many common species, as well as furnishing us with specimens of rare species of which we had no previous representatives, including several new to the Province. Amongst the diurnals were specimens of *Basilarchia arthemis* race *rubrofasciata* B. & McD.; this species must be extremely isolated, as this makes only the third locality from which it has been recorded in eighteen years. The first was a single specimen taken by Mr. Dashwood-Jones at Halcyon Hot Springs, Kootenay Lake, in 1903, and then no further specimens were recorded until Mr. W. A. Newcombe took five in the Chilcotin District in 1915. *Incisalia polias* C. & W.; *Lycænopsis pseudargiolus* form *lucia* Kirby, and form *marginata* Edw.; these are the first specimens of these two forms that I have seen from this Province, although

I have two or three rather poor specimens taken in the Yukon by Mr. T. Bryant which are referable to the form *lucia*. In the Rep. Can. Arc. Exped., Vol. III., page 30, Mr. A. Gibson refers to specimens taken by G. M. Dawson at Dease Lake, B.C., in 1887, which Dr. Fletcher determined as representing the forms *lucia* Kby., *marginata* Edw., and *violacea* Edw. Dease Lake is situated some 60 miles north-east of Telegraph Creek.

In the Sphingidæ, *Smerinthus jamaicensis* f. norm *geminatus* Say. and *Hæmorrhagia thysbe* form *cimbiciformis* Steph. were the best. *Apantesis michabo* Grt. was the most desirable of the arctiids, while in the Noctuidæ the following are worthy of special mention:—

Euxoa plagigera Morr.; *Scotogramma trifolii* Rott., a single specimen which is the first I have seen of the typical form; it may occur at Kaslo, but I have not seen a specimen from there. Anyway, it is quite rare, as is also the race *albifusa* Walk., which occurs on Vancouver Island. A figure of the latter was given in Rep. Prov. Mus., 1916, Plate VII. *Polia farnhami* Grt.; *Bombycia rectifascia* Sm. (*see* "Illustrated Lepidoptera"); *Agroperina morna* Streck.; this is another rare species; the only other one I have seen was collected by Mr. G. O. Day at Cowichan Bay. *Andropolia ædon* Grt.; *Namangana præacuta* Sm.; and *Autographa flagellum* Walk.; this is rather an uncommon *Autographa* in British Columbia, as our previous records are from Agassiz and Kaslo. Amongst the geometers are *Lobophora montanata* race *magnoliatoidata* Dyar., previously taken at Kaslo (Cockle) and Rossland (Danby); *Dysstroma formosa* Hulst.; *Lygris destinata* race *schistacea* Warr.; a single specimen taken on August 30th matches exactly a specimen from Kaslo (Cockle), which was identified by Dr. McDunnough some years ago as this species. I have no other record of it. *Isturgia truncataria* Wlk.; *Itame sulphurea* Pack.; *I. plumosata* B. & McD.; *Euchlæna astylusaria* Wlk.; and one *Eulype hastata* race *subhastata* Nolc.; this race is rather rare in British Columbia collections, although it is rather widely distributed. We have specimens from Atlin, Prince Rupert, and Grouse Mountain, near Vancouver.

Mr. W. B. Anderson, Dominion Inspector of Indian Orchards, who has collected in many different localities during the season, reports that collecting on the whole was decidedly poor, although several good days were experienced, notably May 24th at Penticton and August 15th at Fort Steele. The following are the best of his captures:—

Powell River.—Eriopygea perbrunnea Grt.; *Autographa mappa* G. & R.; and *Diactinia silaceata* race *albolineata* Pack.

Seechelt.—Several specimens of *Epargyreus tityrus* Fabr. were taken, but they were all badly worn as it was rather late for this species—August 6th, to be exact. This species has previously been recorded from Vancouver and Savary Island (R. S. Sherman), where it appears about the latter part of June. A specimen of *Selenia alciphearia* form *ornata* B. & McD. was also taken.

Penticton.—Smerinthus cerisyi opthalmicus form *pallidulus* Edw.; a single specimen of this uncommon form was taken; *Diacrisia pteridis* (*danbyi*) race *rubra* Neum; *Scotogramma oregonica* Grt.; and *Spodolepsis substriataria* race *danbyi* Hulst.

Fort Steele.—Euxoa satiens Sm.; a short series of this rare noctuid was taken in good condition "at light." In our local lists it is simply recorded from "B.C." I have one specimen from Lillooet (Phair) which is referable to this species. *Euxoa quadridentata* race *flutea* Sm.; *Oncocnemis albifasciata* Hamp.; this is also a rare species. A single specimen was taken some years ago by Mr. Anderson at Chilcotin (*see* "Illustrated Lepidoptera"); and *Zenophleps lignicolorata* Pack.

Microlepidoptera.

We have continued our work in this group during the present season and have obtained a number of new records, including several new species. We have also extended our knowledge of the known range of a number of species that have been previously recorded.

Collections have been made at Victoria, Goldstream, Fitzgerald, Mount Tzouhalem, Maillardville, Mount McLean, Chilcotin, and Vavenby, which have resulted in the addition of much desirable material.

As a result of this activity the writer has been enabled to mount about 1,800 of these small moths during the past season, a great many of which have not previously been recorded.

In the Ann. Rep. Prov. Mus., 1920, pages 23 and 24, I gave a list of species taken in that year which were additional to those recorded in the 1906 B.C. Check-list. I am appending a further additional list of species taken during the present year, together with a few taken in 1920, the determinations of which were not to hand when the previous list was printed. Some

of the species have been described since the 1906 Check-list was published; the majority are, however, new records for the Province and a few are new to science.

It is well to state here that this season's captures in the *Tincina* are not included, as they have not yet been worked up owing to the absence from Washington of Mr. August Busck, who is the foremost authority on this group in North America.

The numbers and arrangement are in accord with Messrs. Barnes & McDunnough's Check-list. Those marked with a star have been described since the "List" was published.

Collectors: W. B. Anderson, E. H. Blackmore, E. R. Buckell, W. R. Carter, G. O. Day, A. W. Hanham, L. E. Marmont, and T. A. Moilliet, whose initials only are used in the following records.

Pyralidæ (Pyraustinæ).

4994. *Evergestis subterminalis* B. & McD. Mount McLean (G. O. D.); Vavenby (T. A. M.).
4996. *Evergestis simulatalis* Grt. Fort Steele (W. B. A.); Mount McLean (G. O. D.).

Pyralidæ (Scopariinæ).

* *Scoparia basalis pacificulis* Dyar. Victoria (E. H. B.); Mount Newton (E. H. B.).
* *Scoparia commortalis* Dyar. Victoria (E. H. B.).

Pyralidæ (Schœnobiinæ).

5311B. *Schœnobius melinellus albicostellus* Fern. Alberni (J. Redford).

Pyralidæ (Crambinæ).

* *Crambus tutillus* McD. Victoria (W. R. C.; E. H. B.).

Pyralidæ (Phycitinæ).

5591. *Ambesa lætella* Grt. Chilcotin (E. R. B.).
5631. *Salebria virgatella subcæsiella* Clem. Goldstream (E. H. B.).
* *Pyla blackmorella* Dyar. Mount Tzouhalem (G. O. D.).

Pterophoridæ.

5862. *Platyptilia edwardsi* Fish. Mount McLean (G. O. D.; A. W. H.).
5881. *Platyptilia pallidactyla* Haw. Victoria (W. R. C.); Goldstream (E. H. B.).
Alucita montana declivis Meyr. Fort Fraser (W. B. A.).
5899. *Oidæmatophorus cinereaceus* Fish. Mount McLean (G. O. D.); Vavenby (T. A. M.).
5907. *Oidæmatophorus homodactylus* Wlk. Mount McLean (G. O. D.; A. W. H.); Vavenby (T. A. M.).
Oidæmatophorus occidentalis Wlshm. Fort Steele (W. B. A.); Vavenby, (T. A. M.).
* *Oidæmatophorus corvus* B. & L. Goldstream (E. H. B.); Maillardville (L. E. M.).
5944. *Stenoptilia mengeli* Fern. Mount McLean (A. W. H.).

Gelechidæ.

6021. *Metzneria lappella* Linn. Victoria (E. H. B.).

Oecophoridæ.

6486. *Semioscopis aurorella* Dyar. Maillardville (L. E. M.).
6488. *Semioscopis inornata* Wlshm. Victoria (L. Clarke).

Aegeriidæ.

6758. *Paranthrene perlucida* Busck. Victoria (L. Clarke).

Eucosmidæ.

6770. *Evetria colfaxiana* Kearf. Fitzgerald (W. R. C.).
6803. *Exartema versicoloranum* Clem. Maillardville (L. E. M.).
6840. *Argyroploce mengelana* Fern. Vavenby (T. A. M.).
6842. *Argyroploce urticana* Hub. Maillardville (L. E. M.).
6869. *Argyroploce bipartitana* Clem. Maillardville (L. E. M.).
6885. *Eucosma argenteana* Wlshm. Chilcotin (E. R. B.).

6894. *Eucosma ridingsana* Rob. Vavenby (T. A. M.).
6948. *Eucosma radicana* Wlshm. Victoria (W. R. C.; E. H. B.).
6964. *Eucosma rectiplicana* Wlshm. Victoria (W. R. C.).
7013. *Eucosma illotana* Wlshm. Vavenby (T. A. M.).
7046. *Eucosma medoistriata* Wlshm. Chilcotin (E. R. B.).
7093. *Eucosma tarandana* Moesch. Chilcotin (E. R. B.).
7100. *Eucosma montanana* Wlshm. Chilcotin (E. R. B.).
7144. *Enarmonia pinicolana* Zell. Victoria (W. R. C.).
7146. *Enarmonia fasciolana* Clem. Goldstream (E. H. B.).
7152. *Enarmonia crispana* Clem. Vavenby (T. A. M.).
7182. *Ancylis intermediana* Kearf. Fitzgerald (W. R. C.); Ladysmith (E. H. B.); Maillardville (L. E. M.).
7193. *Ancylis apicana* Wlk. Fitzgerald (W. R. C.).
7204. *Ancylis kincaidiana* Fern. Maillardville (L. E. M.).
7212. *Laspeyresia vancouverana* Kearf. Fitzgerald (W. R. C.); Goldstream (E. H. B.).
7223. *Laspeyresia conversana* Wlshm. Fitzgerald (W. R. C.); Goldstream (E. H. B.).
7225. *Laspeyresia lunatana* Wlshm. Victoria (E. H. B.).
7228. *Laspeyresia zana* Kearf. Mount Tzouhalem (E. H. B.).
7237. *Laspeyresia trossulana* Wlshm. Victoria (W. R. C.).
7244. *Laspeyresia americana* Kearf. Ladysmith (E. H. B.).
7247. *Laspeyresia prosperana* Kearf. Goldstream (E. H. B.).
7260. *Hemimene sedatana* Busck. Mount Tzouhalem (E. H. B.).

Tortricidæ.

* *Cacœcia dimorphana* B. & B. Victoria (W. R. C.).
7405. *Tortricodes horariana* Wlshm. Victoria (W. R. C.).

Phaloniidæ.

7540. *Hysterosia aurcoalbida* Wlshm. Chilcotin (E. R. B.).

Glyphipterygidæ.

7619. *Choreutis balsamorrhizella* Busck. Chilcotin (E. R. B.).

Plutellidæ.

7638. *Euceratia securella* Wlshm. Victoria (W. R. C.).
7674. *Plutella vanella* Wlshm. Victoria (E. H. B.).

Incurvariidæ.

8428. *Incurvaria oregonella* Wlshm. Fitzgerald (W. R. C.); Chilcotin (E. R. B.); Cheakamus (W. B. A.).

Hepialidæ.

8483. *Sthenopis purpurascens* Peck. Vavenby (T. A. M.).

Among those species which have been previously listed, the following, with notes thereon, may prove of interest:—

5087. *Perispasta cæculalis* Zell. Two specimens of this rather uncommon pyraustid were taken by Mr. W. R. Carter at Fitzgerald on June 12th and July 3rd respectively, and a single specimen was taken by Mr. W. B. Anderson at Chase on June 18th.

5093. *Phylctænia itysalis* Walk. This species has a much wider distribution in British Columbia than was at one time supposed. A short series was taken on Mount McLean (A. W. H.) at an altitude of 5,000 feet and a few specimens were taken at Vavenby (T. A. M.). It has been taken at Kaslo (J. W. C.) and we have specimens taken at Atlin (E. M. Anderson).

5143. *Pyrausta semirubralis* Pack. A long series of this pretty ruby and fawn coloured species was taken by Mr. W. R. Carter at Fitzgerald on various dates in June. It occurs at many points on Vancouver Island and has been recorded from Vancouver (R. V. Harvey), but we do not possess any records of its occurrence in the Interior.

5361. *Crambus hortuellus* Hubn. Previous to this season we have only had odd specimens of this species—Victoria (E. H. B.); Vancouver (R. V. Harvey); Lillooet (A. W. Phair)—but

on June 15th Mr. W. R. Carter took a long series in good condition on Gonzales Hill. The majority were of the dark form (*vachellellus* Kearf.), but two or three were as light as Zeller's *topiarius*. It seems to me that *vachellellus* and *topiarius* should be regarded as "forms" and not "races," as the dark, light, and typical forms all occur together.

5369. *Crambus plumbifimbriellus* Dyar. This species was described from sixteen specimens taken by Dyar at Kaslo in 1903. We have had no other record of it until Mr. Buckell took a single specimen at Chilcotin on July 15th, 1920. During the present season two specimens were taken at West Summerland by Mr. J. W. Richmond on June 20th, and a single specimen was taken by Mr. L. E. Marmont at Fraser Mills on July 27th. The latter is rather an unexpected locality for this species.

5583. *Promylea lunigerella* Rag. This is apparently a rather rare species. One specimen was taken by the writer at Victoria on July 17th, 1917; another specimen on Mount Newton, August 1st, 1920; and I took a third specimen on August 22nd of this year. I have not seen any others. It was described from "Vancouver Island" by Ragonot in 1887.

* *Carcina quercana* Fab. In last year's Report, page 31, this species was recorded by the writer as being new to North America. Meyrick (Handb. Brit. Lep., 1905) gives apple as one of its food-plants, and a sharp look-out was kept on the apple-trees in my garden for both larvæ and pupæ, but none was found. On July 15th, about 8 p.m., I noticed a newly emerged adult resting on the leaf of a large spreading shrub which is trained up the front of the house. An extended search for further specimens resulted in finding several pupæ spun up on the leaves of this shrub which turned out to be *Cotoneaster pyracantha* Linn., commonly known as fire-thorn or Christ's-thorn. (Upon investigation I found that this particular shrub was purchased from a local nurseryman and planted in the garden about seventeen years ago). A further search was made the next evening and altogether some twenty pupæ were obtained. Meyrick (*ibid.*, page 613) states that the pupæ spin a flat web beneath the leaves; I found that they spun their webs both on the upper and the lower surface of the leaves in about equal proportions. The pupa is of a bright golden-brown and the web is of thick white silk. The moths began to emerge about the 20th and continued to do so for several days. Several of the pupæ were parasitized and two hymenopterous species were bred out. These have been determined by Mr. R. A. Cushman, of the U.S. National Museum, as *Ephialtes sanguineipes* Cress. and *Itoplectis pacificus* Cush.

6448. *Agnopteryx rosaciliella* Busck. Two specimens of this uncommon œcophorid were taken at Fraser Mills by Mr. Marmont on April 17th.

6459. *Agnopteryx argillacea* Wlshm. A single specimen was taken by Mr. W. R. Carter at Fitzgerald on March 28th.

6836. *Argyroploce galaxana* Kearf. The writer took a long series of this pretty little moth on Mount Tzouhalem on May 24th. It was described (Trans. Am. Ent. Soc., XXXIII., 9, 1907) from two specimens taken at Vernon, B.C., and one from Victoria, B.C.

6864. *Argyroploce campestrana* Zell. Four specimens were taken by Mr. Hanham on Mount McLean in August, and Mr. Moilliet took two at Vavenby on July 3rd. Dr. Dyar records taking it at Kaslo and states that the larvæ occurred on the common thimble-berry (*Rubus nutkanus*).

7263. *Hemimene britana* Busck. The writer took a long series of this species at Goldstream on June 1st to 3rd. It was easily started up in the evenings from patches of red clover alongside the railway-track. A peculiar feature was that during the daytime no amount of beating would disturb them, only one individual being taken in two attempts, although an hour before sunset the slightest tap would start four or five up immediately. The species was described (Proc. Biol. Soc. Wash., XIX., 178, 1906) from specimens taken by Dr. Dyar at Kaslo in 1903. Dyar in his "Kootenai List," page 929, recorded it under the name of *alpinana* Treitschke, but Mr. Busck states in his description that it is quite distinct from the European species.

7342. *Cacœcia persicana* Fitch. Of this handsome dark-red and ochre species the writer took a single specimen at Goldstream on July 2nd, and Mr. Marmont took another individual at Fraser Mills on June 16th. We have specimens from Wellington (Bryant) and Rossland (Danby). The species is apparently more plentiful at Kaslo.

7426. *Peronea variana* Fern. This exceedingly variable species seems rather uncommon in British Columbia. Mr. Marmont took two specimens at Fraser Mills on September 26th. It is recorded from Kaslo (Cockle); Field (Dyar); and Mr. Hanham has taken two or three specimens at Duncan.

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PLATE III.

NOCTUIDÆ.

Euxoa excellens infelix Sm.
Fort Steele, B.C. (W. B. Anderson).
(New to British Columbia.)

Acronycta radcliffei Harvey.
Duncan, B.C. (G. O. Day).
(Rather rare.)

Oligia tonsa Grt.
Kaslo, B.C. (J. W. Cockle).
(Rather rare.)

Lampra nefascia Sm.
Victoria, B.C. (E. H. Blackmore).
(Previously misidentified.)

Eriopyga bostura Sm.
Kalso, B.C. (J. W. Cockle).
(New to British Columbia.)

Sympistis zetterstedti labradoris Staud.
Mount McLean, B.C. (A. W. Hanham).
(New to British Columbia.)

Tæniosea discivaria Wlk.
Vavenby, B.C. (T. A. Moilliet).
(New to British Columbia.)

Trachea inordinata montana Sm.
Chilcotin, B.C. (E. R. Buckell).
(New to British Columbia.)

Oligia tonsa subjuncta Sm.
Chilcotin, B.C. (E. R. Buckell).
(Very rare.)

Bombycia rectifascia Sm.
Vavenby, B.C. (T. A. Moilliet).
(Rather rare.)

Bombycia curvifascia Sm.
Fraser Mills, B.C. (L. E. Marmont).
(New to British Columbia.)

Oncocnemis albifasciata Hamp.
Chilcotin, B.C. (W. B. Anderson).
(Very rare.)

Euxoa rufula Sm.
Mount McLean, B.C. (A. W. Hanham).
(New to British Columbia.)

Orosagrotis incognita Sm.
Mount McLean, B.C. (A. W. Hanham).
(New to British Columbia.)

Polia olivacea davena Sm.
Kaslo, B.C. (J. W. Cockle).
(New to British Columbia.)

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7604. *Allononyma vicarialis* Zell. The writer took two specimens in beautiful condition on April 17th at Fitzgerald and two specimens at Goldstream on May 30th, the latter being rather worn. This is the same insect which Dr. Dyar described as *A. diana* var. *betuliperda* and which is listed in our 1906 Check-list from Kaslo. An examination of Zeller's type in Lord Walsingham's collection by Mr. Busck (Pro. Ent. Soc. Wash., XI., 97, 1909) in 1908 proved that *vicarialis* and *betuliperda* were conspecific.

Illustrated Lepidoptera.

Noctuidæ (Plate III.).

1226. *Orosagrotis incognita* Sm. The specimen illustrated was taken on Mount McLean, near Lillooet, B.C., at an altitude of 5,000 feet by Mr. A. W. Hanham on August 21st, 1920. It was described (Trans. Am. Ent. Socy., Vol. XXI., page 52, 1894) from two males taken at Laggan, Alta., by Bean at an altitude of 7,000 feet. In Smith's description he gives the locality as Laggan, British Columbia. It is as well to note here that the majority of Smith's earlier references to British Columbia and to "North-west B.C." really refer to Northern Alberta. That is the reason why so many of his species still stand in our local lists as "B.C." without any further specific localities. Mr. Hanham says that the species was not at all uncommon, but unfortunately most of the specimens taken were somewhat worn.

1274. *Euxoa rufula* Sm. This species was also taken by Mr. Hanham at the same time and place, but was much more scarce than the preceding. It was described (Pro. U.S.N.M., X., 461, 1887) from a single male taken by Professor Snow in New Mexico at an altitude of 7,000 feet. Dr. A. W. Lindsey, who kindly identified it, states that the Mount McLean specimen is darker than specimens from Wyoming in the Barnes collection.

1364a. *Euxoa excellens* race *infelix* Sm. Taken by Mr. W. B. Anderson at Fort Steele on August 15th, 1921. It was described (Trans. Amer. Ent. Socy., XVII., page 57, 1890) from California as a distinct species, but later (Cat. Noct., 1893) Smith placed it as a synonym of *excellens*. It has been rescued from the synonymy by Barnes & McDunnough, who have placed it as a race of *excellens*. The maculation is practically the same, but *infelix* is of an even dark colour in contradistinction to the contrasting shades of the typical form. Mr. Cockle has also taken a single specimen at Kaslo.

1584. *Lampra* (*Rhynchagrotis*) *nefascia* Sm. (not *negascia* as listed, *vide* Benjamin, Bull. So. Calif. Acad. Sci., XX., 100, Dec., 1921). This species has never been properly placed in British Columbia collections. It has generally been placed under the name of *anchocelioides* Gue.; sometimes under *alternata* Grt. The majority of the specimens that I have seen are of a very even brownish-grey, with the terminal area distinctly paler. The species comes commonly to "sugar" at Duncan and I have taken it "at light" at Victoria and Goldstream in September. Mr. Foster H. Benjamin, who has recently revised this difficult genus, has kindly gone over my material in this group, and our British Columbia species are now more accurately placed than was previously the case.

1755g. *Polia olivacea* race *davena* Sm. Taken by Mr. J. W. Cockle at Kaslo on June 22nd, 1910. Amongst some material sent to us for examination by Mr. Cockle was this specimen, which seemed distinct from any of the five named varieties which are in the Museum collection. It was submitted to Dr. Lindsey, who identified it as *davena* Sm. It seems closer to *comis* Grt. than to any other named form, but the pale areas are not so light or so well defined, so that *davena* is not so contrasty in appearance as *comis*.

1828. *Eriopyga bostura* Sm. The specimen figured was taken by Mr. Cockle at Kaslo on August 21st, 1913. It does not appear to have been taken in any other locality in British Columbia. The only reference that I can find of this species in the literature that I have at hand is a note by Wolley-Dod in Bull. B.C. Ent. Soc., No. 10, June, 1908. Under the heading of "Additions" he lists *Graphipora bostura* Sm. (Ann. N.Y. Ac. Sci., XVIII., 103). Type from Kaslo.

2022. *Oncocnemis albifasciata* Hamp. This is the most striking of the British Columbia species of this genus. The specimen figured was taken by Mr. W. B. Anderson at Chilcotin on August 26th, 1918. The same collector took the species again at Fort Steele on August 15th, 1921. Sir George Hampson lists it "from North-west British Columbia."

2117. *Bombycia curvifascia* Sm. Taken by Mr. L. E. Marmont at Maillardville, B.C., on August 10th, 1920. This is the first specimen of this species that I have any record of from

British Columbia. It was described from California (Trans. Am. Ent. Soc., XVIII., 109, 1891). Dr. Lindsey, who kindly determined this specimen, states that there is one specimen in the Barnes collection from Victoria, B.C., which has been identified as *B. thula* Strecker.

2120. *Bombycia rectifascia* Sm. The specimen figured was taken at Vavenby, B.C., by Mr. T. A. Moilliet on August 14th, 1921. The species has been taken at Kaslo by Mr. Cockle, and Mr. Day has taken a specimen at Duncan, which was determined by Wolley-Dod as this species with a question-mark. I have not had an opportunity to compare Mr. Day's specimen with the one from Vavenby.

2201A. *Sympistis zetterstedti* race *labradoris* Staud. Taken by Mr. Hanham on Mount McLean on August 21st, 1920. This is a fine record as the species is arctic. It was described from Labrador. It is very rare in North American collections.

2275A. *Trachea inordinata* race *montana* Sm. This specimen was taken by Mr. E. R. Buckell at Chilcotin, B.C., on May 30th, 1920. This is another good record and adds another name to our list. It was described (Proc. U.S.N.M., XIII., 444, 1890) from Colorado.

2342. *Oligia tonsa* Grt. Taken by Mr. Cockle at Kaslo, B.C., on August 1st, 1907.

2342A. *Oligia tonsa* race *subjuncta* Sm. Taken by Mr. Buckell at Chilcotin, B.C., on August 1st, 1920. I have taken these two forms together, as there has been considerable doubt expressed at different times as to their specific identity. The former was described by Grote (Can. Ent., XII., 214, Oct., 1880) from Nevada as *Hadena tonsa*. The latter by Smith (Can. Ent., XXX., 323, Dec., 1898) from Colorado and Calgary, Alta. (Dod), as *Hadenella subjuncta*. In Bull. 52, U.S.N.M., 1902, Dyar sinks *subjuncta* as a synonym of *minuscula* Morr., but Dr. Smith, in Trans. Am. Ent. Soc., XXIX., 194, states that it has nothing to do with *minuscula*, but it is really a synonym of *tonsa* Grt. Dyar, in Proc. U.S.N.M., XXVII., 809, apparently agrees with this and records *tonsa* from Kaslo, B.C., and states that the specimens agree with the type of *subjuncta*. Wolley-Dod, in Can. Ent., XLIII., 152, May, 1911, discusses the matter at some length, but believes that *tonsa* and *subjuncta* are distinct. Barnes & McDunnough have listed (Check-list, Lep. Bor. Amer., 1917) *subjuncta* as a race of *tonsa*, a proceeding which seems a far more satisfactory solution.

I submitted the Kaslo specimen to Dr. Lindsey as *tonsa* Grt., and he kindly verified my determination. I have carefully compared Mr. Buckell's specimen with the description and it agrees in all essential particulars. It also agrees fairly well with Holland's figure on Plate XIX., Fig. 25. I have specimens from Nordegg, Alta. (Bowman), which match exactly the Chilcotin specimen. They were sent to me as *tonsa*.

2364. *Tæniosea discivaria* Walk. Taken by Mr. Moilliet at Vavenby on July 28th, 1921. As far as I know, this is a new record for British Columbia. It varies considerably in depth of colouring, one specimen showing considerable red shading.

2470. *Acronycta radcliffei* Harv. The specimen figured was taken at Quamichan Lake, near Duncan, by Mr. G. O. Day on June 12th, 1908. This is a rare species in British Columbia. It is very close in general habitus to *A. grisea revellata* Sm. Mr. Day's specimen agrees with the description (Proc. U.S.N.M., XXI., 107, 1899) and with the figure given on Plate XII., Fig 4. It was listed in the 1904 B.C. Check-list from Kaslo, B.C., but Dyar did not record the species in his "Kootenai List," and it was omitted, probably intentionally, from the 1906 B.C. Check-list. Mr. Cockle has a specimen which has been identified by Dr. McDunnough as this species. I have no other records of it, although it may be confused with *revellata* in some collections. *Radcliffei* is a much narrower-winged species and the course of the t.p. and s.t. lines are different. In *radcliffei* the t.p. line is broadly outcurved from costa, while in *revellata* it is only slightly oblique, with the s.t. line parallel, at least superiorly.

Geometridæ (Plate IV.).

3997. *Dysstroma ethela* Hulst. The specimen figured was taken by the writer at Goldstream, B.C., on July 3rd, 1921. It is rather a rare species and this is the first specimen that I have taken; it is the most perfect specimen I have seen of this species. It is closely allied to *D. casloata* Tayl., but can generally be separated from the latter by the narrower median band and the absence of the extra-basal bar. It has been taken at Wellington (Bryant), Duncan (Day & Hanham), and I have seen one specimen taken at Victoria (Meugens, 29, VI., 20). Described by Hulst (Trans. Am. Ent. Socy., XXIII., 283, 1896) from a single male taken at Sierra Nevada, Cal.

4009E. *Hydriomena nubilofasciata* form *vulnerata* Swett. This species is new to the Province and was taken by Mr. W. Downes at Sluggett's, V.I., on March 1st, 1921. Some years previously Mr. Downes, who was then living in that locality, noticed a species of *Hydriomena* occurring in February which was apparently different from any of our known spring species in that genus. Owing to various causes no opportunity offered until this spring to investigate the matter, when a nice series was taken with the aid of a lantern. *Nubilofasciata* Pack. has six described forms or races, all of which are colour forms (*vide* Swett, Can. Ent., XLIII., 79, 1911); this species can at once be differentiated from any other British Columbia species by the dark marginal band of primaries. Mr. Swett in his notes states that he has the species from British Columbia amongst a number of widely spread localities, but he does not give any specific locality, neither does he refer to any particular form.

4192. *Eupithecia interruptofasciata* Pack. The specimen figured was taken by Mr. G. O. Day at Maple Bay, near Duncan, B.C., in August, 1913. This species has not been hitherto recorded from British Columbia. It is an inhabitant of the Atlantic States and was described in Fifth Rept. Peab. Acad. Sci., 59, 1873. Mr. Day states that it is rather rare and very local; he has not taken it in any other locality in the vicinity, excepting Maple Bay.

4209. *Eupithecia mutata* Pears. Taken by the writer at Goldstream on July 2nd, 1921. This is one of the rarer species of this genus. The only other specimen that I have seen is a rather worn individual taken by myself in a pine woods near Victoria on July 18th, 1913. The specimen figured is in good condition and was obtained by "beating" in a heavily wooded (chiefly Douglas fir) district. It agrees with Pearsall's description (Journ. N.Y. Ent. Soc., XVI., 98, June, 1908). The species was described from the Catskill Mountains, New York State. It is closely allied to *albicapitata* Pack., which is also a rare species in the Province, our only records being Cowichan Lake (Day) and Kaslo (Cockle).

4223. *Eupithecia scabrogata* Pears. This is another new record to add to the already long list of *Eupithecias* (about fifty) recorded from British Columbia. It was taken by Mr. Theo. Bryant at Wellington, B.C., on April 16th, 1903. One other specimen taken on March 24th of the same year is not in such good condition. It is quite distinct from any other species that we have. The determination was made for us by Mr. L. W. Swett.

4316-1. *Drepanulatrix secundaria* B. & McD. Taken by Mr. Cockle at Kaslo, B.C., on June 14th, 1910. At first thought to be a new species. It, however, agrees with the description (Cont. Lep. No. Amer., Vol. III., No. 1, page 25, Nov., 1916) of *secundaria*, and Dr. Lindsey, who compared it with the types, believes it to be this species, although it is rather far north. The species was described from Mineral King, Cal.

4374. *Phasiane hebetata* Hulst. Taken at Chilcotin, B.C., by Mr. E. R. Buckell on July 16th, 1921. This is the first specimen of this species in good condition that I have seen. We have had two specimens previously—one from Atlin (E. M. Anderson) and the other from Chilcotin (W. A. Newcombe)—that were referable to this species, but were so denuded of scales as to make accurate identification impossible. The course of the extra and intra-discal lines are exactly the same as Barnes & McDunnough's figure (Cont. Lep. No. Amer., Vol. III., No. 4, Plate XXII., Fig. 9) of *demaculata*, which the authors later (*ibid.*, Vol. IV., No. 2, page 149) sunk as a synonym of *hebetata*. Mr. Buckell's specimen agrees with the description and the figure mentioned. The type material of *demaculata* also included a specimen from Field, B.C. The species has a wide range, but is rare in British Columbia.

4425. *Itame pustularia* Hub. This is another very rare species in British Columbia. The specimen figured was taken by Mr. A. W. Phair at Lillooet, B.C., on June 29th, 1920. The only other specimen that I know of in the Province is a specimen taken at Kaslo by Mr. Cockle many years ago. It occurs throughout the Atlantic States and I have specimens from Manitoba. It has not been recorded from Alberta.

4453. *Dysmigia loricaria* Evers. This species is new to the Province. A nice series was taken by Mr. T. A. Moilliet at Vavenby, B.C., during the middle of July, 1921. It was recorded in the 1904 B.C. Check-list under the name of *Sympherta Julia* Hulst., and the localities given are Rocky Mountains and Kaslo (?). I have seen all Mr. Cockle's species and he has not taken it. The species was left out in the 1906 List. Some specimens, especially if a little rubbed, closely resemble *Itame exauspicata* Wlk., which also occurs in the same district. The females are wingless.

Pyralidæ (Pyraustinæ).

4994. *Evergestis subterminalis* B. & McD. Taken on Mount McLean by Mr. G. O. Day on August 8th, 1921. Very close to *funalis* Grt., which also occurs in British Columbia. The latter is taken at Kaslo and I have a specimen from Vavenby (T. A. Moilliet). It is recorded in the 1906 Check-list from Vancouver Island, but this is an error. A specimen from Wellington (Bryant) labelled *funalis* is undoubtedly *insulalis* B. & McD., which occurs at several points on the Island.

4996. *Evergestis simulatalis* Grt. This pretty species was taken by Mr. W. B. Anderson at Fort Steele, B.C., on August 15th, 1921. Mr. Day also took a single specimen on Mount McLean on August 10th. Dyar lists the species from Arizona and Colorado.

Pyralidæ (Scopariinæ).

**Scoparia basalis* race *pacificalis* Dyar. Described (Ins. Ins. Mens., LX., 66, 1921) as a new race from specimens, three taken by the writer at Victoria and Mount Newton and one taken at Grayland, Wash. (H. K. Plank) ; it occurs from mid-July to mid-August. The specimen figured is one of the co-types and was taken on Mount Newton on August 1st, 1920. *Fernaldalis* Dyar is now placed as a race of *basalis*. Dyar in his "Kootenai List" records taking a long series of *fernaldalis* at Shawnigan Lake, B.C. It is also recorded from Kaslo, B.C.

**Scoparia commortalis* Dyar. This new species was described (*Ibid.*, page 67) from specimens taken by the writer at Victoria, B.C., July 15th to 17th, 1920. This species is quite distinct from any other of our British Columbia scoparids and is easily recognizable by its generally brown appearance and the presence of a broad dark-brown band which follows the pale outer line. One of the male co-types is figured.

5248. *Scoparia tricoloralis* Dyar. Taken by Mr. L. E. Marmont at Maillardville, B.C., on July 13th, 1921. This does not appear to be a common species by any means, although it is recorded from several points—Wellington (Bryant), Duncan (Skinner), Ainsworth (Dyar), and Kaslo (Cockle). It is the most brightly coloured of the British Columbia species and is rather a pretty insect. Mr. Marmont took three specimens on the 13th and one on the 26th, but it was not observed between those dates, although it was searched for. He did not take any the previous year.

Pyralidæ (Crambinæ).

**Crambus tutillus* McDun. The specimen figured is a male paratype kindly returned to me by Dr. McDunnough. It was taken by the writer on May 28th, 1918. This species is very common in Victoria, generally occurring about the middle of May. It is very close to *dissectus* Grt. and had previously been determined for me as this species, under which name it was listed on page 24, Prov. Mus. Rep., 1920. This is the same insect that was listed in the 1904 B.C. Check-list as "*dumetellus* Hub. Generally distributed (common)." I have seen specimens in the Bryant collection labelled *dumetellus* which are undoubtedly McDunnough's new species. Dr. McDunnough in his description states that "It (*tutillus*) is probably closest to *dumetellus* Hub., differing in the much shorter and less distinct white costal line." Dr, Fernald in his "Crambidæ of North America," 1896, gives a coloured figure of *dissectus* (Plate II., Fig. 12) and one of *dumetellus* (Plate III., Fig. 2), and a comparison of these figures with specimens of *tutillus* shows that the latter is closer to *dumetellus* than it is to *dissectus*.

Pyralidæ (Phycitinæ).

**Pyla blackmorella* Dyar. Described by Dr. Dyar (Ins. Ins. Mens., 68, 1921) from two specimens taken by the writer on Mount Tzouhalem, near Duncan, B.C., on June 24th, 1913. A figure of the male paratype is given. The writer in company with Mr. G. O. Day climbed Mount Tzouhalem on May 24th of the present year, but we were about three weeks too soon for this species. Mr. Day, however, secured a nice series on June 13th. It has not been recorded from any other locality.

Occophoridæ.

6486. *Semioscopis aurorella* Dyar. The specimen figured was taken by Mr. L. E. Marmont at Maillardville, B.C., on March 4th, 1921. Another specimen was taken on the 14th of the same month. These two specimens are the only records that we have of this species in the Province.

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PLATE IV.

GEOMETRIDÆ.

Hydriomena nubilofasciata vulnerata Swett.
Sluggett, B.C. (W. Downes).
(New to British Columbia.)

Eupithecia interruptofasciata Pack.
Maple Bay, B.C. (G. O. Day).
(New to British Columbia.)

Dysmigia loricaria Evers.
Vavenby, B.C. (T. A. Moilliet).
(New to British Columbia.)

Drepanulatrix secundaria B. & McD.
Kaslo, B.C. (J. W. Cockle).
(New to British Columbia.)

Eupithecia mutata Pears.
Goldstream, B.C. (E. H. Blackmore).
(Very rare.)

Phasiane hebetata Hulst.
Chilcotin, B.C. (E. R. Buckell).
(Rather rare.)

Dysstroma ethela Hulst.
Goldstream, B.C. (E. H. Blackmore).
(Rather rare.)

Eupithecia scabrogata Pears.
Wellington, B.C. (T. Bryant).
(New to British Columbia.)

Itame pustularia Hubn.
Lillooet, B.C. (A. W. Phair).
(Very rare.)

MICROLEPIDOPTERA.

Evergestis simulatalis Grt.
Fort Steele, B.C. (W. B. Anderson).
(New to British Columbia.)

Evetria colfaxiana Kearf.
Fitzgerald, B.C. (W. R. Carter).
(New to British Columbia.)

Evergestis subterminalis B. & McD.
Mount McLean, B.C. (G. O. Day).
(New to British Columbia.)

Scoparia commortalis Dyar.
(Male co-type.)
Victoria, B.C. (E. H. Blackmore).
(New to science.)

Scoparia basalis pacificalis Dyar.
(Male co-type.)
Mount Newton, B.C. (E. H. Blackmore).
(New to science.)

Semioscopis aurorella Dyar.
Fraser Mills, B.C. (L. E. Marmont).
(New to British Columbia.)

Enarmonia pinicolana Zell.
Victoria, B.C. (W. R. Carter).
(New to British Columbia.)

Pyla blackmorella Dyar.
(Male paratype.)
Mount Tzouhalem, B.C. (E. H. Blackmore).
(New to science.)

Choreutis balsamorrhizella Busck.
Chilcotin, B.C. (E. R. Buckell).
(New to British Columbia.)

Argyroploce mengelana Fern.
Vavenby, B.C. (T. A. Moilliet).
(New to British Columbia.)

Crambus tutillus McD.
(Male paratype.)
Victoria, B.C. (E. H. Blackmore).
(New to science.)

Argyroploce duplex Wlsm.
Victoria, B.C. (W. R. Carter).
(Very local.)

Scoparia tricoloralis Dyar.
Fraser Mills, B.C. (L. E. Marmont).
(Rather uncommon.)

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Eucosmidæ.

6770. *Evetria colfaxiana* Kearf. Taken by Mr. W. R. Carter at Fitzgerald, B.C., on April 17th, 1921. A short series of five specimens was taken on this date and a single specimen on May 8th. This species has not hitherto been recorded from the Province. Kearfott (Trans. Am. Ent. Soc., XXXIII., 3, 1907) described the species from a single male taken at Colfax, Cal.

6840. *Argyroploce mengelana* Fern. This is a good record and is new to British Columbia. A single specimen, luckily in good condition, was taken at Vavenby, B.C., by Mr. T. A. Moilliet on July 12th, 1921. It was described (Ent. News. V., 131, 1894) from ten specimens in poor condition taken by Mr. L. W. Mengel in North Greenland in 1891.

6859. *Argyroploce duplex* Wlshm. A nice series of this handsome eucosmid was taken by Mr. W. R. Carter from June 21st to 28th, 1921. It is exceedingly local and was only taken in a very small area. They were all taken "at rest" on a board fence bordering a small grove of aspen, which is undoubtedly their food-plant. Dr. Dyar in his "Kootenai List" records finding the larvæ of this species on aspen at Kaslo. It has not been recorded from any other locality in the Province. I have seen one other specimen taken by Mr. Hanham at Victoria, B.C., many years ago. It was described (Trans. Ent. Soc., Lond., 501, 1895) from Colorado.

7144. *Enarmonia pinicolana* Zell. The specimen illustrated was taken at Victoria, B.C., by W. R. Carter on July 20th, 1921. It is rather uncommon. Mr. Carter has taken two specimens and the writer took one in July, 1918. It bears a close superficial resemblance to some forms of *Eucosma solandriana* Linn. The species was described by Zeller in 1846 and is widely distributed. Meyrick (Handb. Brit. Lep., 474, 1895) gives its distribution as Great Britain, North and Central Europe, and North Asia, and its food-plant as larch.

Glyphipterygidæ.

7619. *Chorentis balsamorrhizella* Busck. Taken by Mr. E. R. Buckell at Chilcotin, B.C., on May 20th, 1920. This pretty little species, with its sprinkling of iridescent scales, is a new record for the Province. Four specimens were taken, but they were not in the most perfect condition, the one figured being the best. It has also been taken at Vernon (Ruhmann).

Our sincere thanks are due to the following specialists for identifying material during the past season: Dr. J. M. Aldrich, Dr. W. Barnes, Foster H. Benjamin, August Busck, R. A. Cushman, Dr. H. G. Dyar, Carl Heinrich, Dr. A. W. Lindsey, Dr. J. McDunnough, S. A. Rohwer, and L. W. Swett.

THE PTEROPHORIDÆ OF BRITISH COLUMBIA.

By E. H. BLACKMORE, F.E.S.

The recent publication of "The Pterophoridæ of America, North of Mexico," by Drs. Barnes and Lindsey (Cont. Lep. No. Amer., Vol. IV., No. 4, Aug. 1921) has so altered our conception of many of the species, and also of some of the genera in this family, that I have thought it advisable to write this short paper on the species occurring in British Columbia, and to bring them up to date as regards correct determination and nomenclature.

In the Check-list of British Columbia Lepidoptera published in 1906 there are naturally a number of misidentifications, many species to be eliminated, and there are also a considerable number of additions.

The species of this family are for the greater part very difficult to determine correctly, and I wish to express my sincere thanks to Dr. A. W. Lindsey for his willing and kindly help in determining a large number of specimens of doubtful and little-known species. I am also grateful for his kind permission to make use of any part of the "Revision" that is applicable to our British Columbia species.

My thanks are also due to Messrs. Bryant, Cockle, Day, Hanham, and Ruhmann for the loan of material, without which this paper would have been incomplete.

The Pterophoridæ can be distinguished primarily from any other family by the presence of a series of black spine-like scales on the under-surface of the secondaries.

In all the North American species, with one exception, the primaries are bifid and the secondaries are trifid. The exception noted is *Agdistis americana* B. & L., which has both fore and hind wings entire. Two other exotic genera have the same characteristic, while another one has the primaries quadrifid and a third has them trifid.

The following general remarks on the family as a whole, taken from Genera Insectorum Fasc., 100 (Pterophoridæ by E. Meyrick), will prove of interest:—

"Ovum more or less oval, smooth. Larva rather short, with more or less developed fascicles of hairs; usually feeding exposed on flowers or leaves, but sometimes internally in stems or seed-vessels. Pupa sometimes hairy, attached by tail. or in a slight cocoon above ground. The majority of those species whose food-plants are known are attached to the Compositæ, which are the most highly organized group of dicotyledonous plants, and this is especially true of the two largest genera, *Platyptilia* and *Pterophorus* (*Oidæmatophorus*), where the association with this order is very marked, probably nine-tenths of the species being attached to it.

"The fore wings of the imago are very elongate, narrow, dilated posteriorly, and the legs are very long and unusually slender. The general structure seems adapted to secure extreme lightness, thus enabling distribution to be effected by the wind without much effort on the part of the insect; hence the species need and possess very little muscular power, and are quite unable to fly against even a moderate breeze. The method of distribution has been effective, for the species have spread over the whole globe, including the principal oceanic islands; though the wide distribution of some cosmopolitan species is due to artificial introduction with the cultivated shrubs and trees on which the larvæ feed.

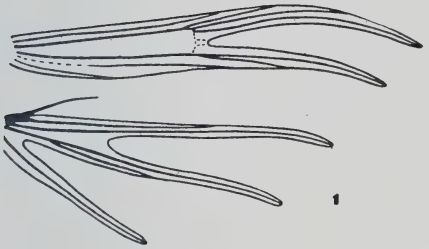
"Probably all the principal genera originated in Asia, which shows much the greatest diversity of generic forms; the great specific development of *Platyptilia* and *Pterophorus* (*Oidæmatophorus*) in America would seem to be due to the large variety of abundant suitable food-plants (Compositæ) offered, whilst the relatively insignificant generic modification indicates that the family did not find its way to America until long after its first origin. I infer, therefore, that it originated not only late in time, but at a period when Asia was comparatively isolated from other regions by wide seas, and that on eventually gaining access to the other continents it found them already well-stocked with a large lepidopterous fauna."

In North America eleven genera are listed, embracing some 116 species, of which British Columbia is represented by six genera with a total of 30 species, being slightly over 25 per cent. of the whole. The synonyms of genera and species are not given in their entirety, but only so far as they represent names previously given in former B.C. Check-lists. The descriptions of genera are given with the venation omitted, but sufficient structural characters are given that with the additional aid of the plate, no difficulty should be experienced in placing any specimen in its proper genus. The descriptions of species are not given in full detail, but all the essential characters necessary for the identification of our British Columbia species are included.

PLATE V.

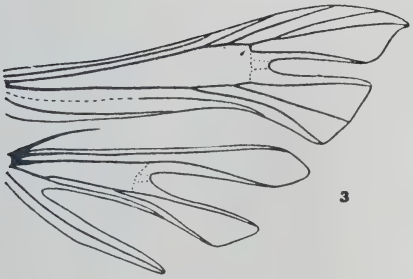
PTEROPHORIDÆ.

Wing Outlines of British Columbia Genera.

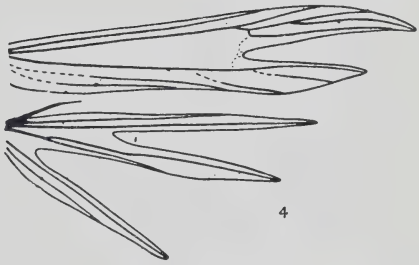


1. Trichoptilus.

2. Pterophorus.

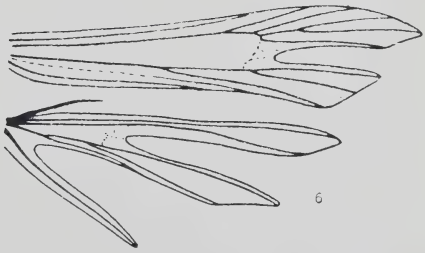


3. Platyptilia.



4. Stenoptilia.

5. Adaina.



6. Oidæmatophorus.

Note.—The above figures were photographed from the original plate in Messrs. Barnes and Lindsey's "Pterophoridæ of America, North of Mexico," by the kind permission of Dr. A. W. Lindsey.

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FAMILY PTEROPHORIDAE.

Genus TRICHOPTILUS Walsingham.

Trichoptilus Walsingham, Pteroph. Cal., Ore., 62, 1880. Characters: Forehead without tuft; ocelli obsolete. Labial palpi moderate, ascending. Fore wings cleft from before middle, both lobes slender, tapering, without anal angle.

1. Trichoptilus pygmæus Walsingham, Pter. Cal., Ore., 64, 1880. A very small species measuring about 10 mm. in expanse. Fore wings very pale fawn, barred with white on both lobes.

Two specimens taken at Wellington, B.C. (Bryant), on 30-VI.-03 and 11-VII.-03 respectively. One specimen is without head or body and the other is simply pinned. There is no record of any other specimens having been taken since. An exceedingly rare species. The type series included three specimens taken near Millville, Cal., on July 11th, 1871. Two of them are in the British Museum, the remaining one being in the Fernald collection at Amherst, Mass. One other specimen is in the U.S. National Museum. I believe that these six specimens are all that are known.

Genus PTEROPHORUS Geoffroy.

Pterophorus Geoffroy, Hist. Nat. Ins., II., page 90, 1762.

Oxyptilus Zeller, Isis X., page 765, 1841.

Characters: Forehead smooth without tuft; ocelli obsolete. Labial palpi moderate, oblique; second joint with a ventral apical tuft in one British Columbian species; third joint moderate. Tibiæ thickened with scales at base of spurs. Primaries bifid, cleft from about middle. Secondaries trifid, third feather with a well-developed tuft of black scales in the fringes of the inner margin.

1. Pterophorus tenuidactylus Fitch. Trans. N.Y. Agr. Soc., XIV., 848, 1854. Primaries dark brown with a coppery tinge, with a fine transverse white line across outer half of both lobes. First lobe with a broader stripe basad of this; second lobe with this stripe reduced to a small white patch. Palpi white with lateral brown stripes. Thorax white behind. Abdomen brown with diverging pairs of white stripes on the third segment. Fourth segment entirely brown above; fifth mostly white. Beneath the abdomen is more heavily marked with white. Expanse, 13–17 mm.

Dyar in his "Kootenai List" records two specimens of this species as having been bred from the thimble-berry (*Rubus nutkanus*). Specimens sent to me by Mr. J. W. Cockle from Kaslo as *tenuidactylus* turn out to be *Pterophorus delawaricus* Zell. The only authentic specimen that I have seen is a unique taken by Mr. G. O. Day at Quamichan Lake, near Duncan, on July 14th, 1907. Dr. Lindsey tells me that the species is widely distributed and is quite common in some localities.

2. Pterophorus ningoris Walsingham, Pter. Cal., Ore., 26, 1880. Fore wings dull brown with a greyish cast caused by the presence of white and fuscous scales. Both lobes crossed by two white lines; the outer one slender, the inner one broad. The lobes are somewhat narrower than in our other two species of this genus. Secondaries brown; third lobe paler, white beyond middle, with large tuft of blackish scales in fringes at outer third. Palpi rather long and slender, oblique, dark brown, with both joints white-tipped. First spurs attached about three-fifths from base of tibia and reaching its tip. Expanse, 18–20 mm.

Dyar records it from Kaslo and states that the larvæ were found feeding on a herbaceous plant with milky juice, *Hieracium albiflorum*. In our 1906 B.C. Check-list it is also recorded from Wellington, but the specimens labelled *ningoris* in the Bryant collection and from which the record was taken all prove upon examination to be *delawaricus*. Mr. Day took one female specimen at Cowichan Lake on June 18th, 1913.

3. Pterophorus delawaricus Zeller, Verh z-b Ges. Wien., XXIII., 320, 1873. Fore wings bright golden-brown, with both lobes crossed by two inwardly oblique white stripes; the outer one slender, the inner one broader. Palpi brown at the sides; the vestiture of the second joint produced into a point below, which almost reaches tip of third. Abdomen with diverging white dashes above. Expanse, 18–20 mm.

This species is far more common than the other two. I have it from Victoria (Blackmore); Fitzgerald (Carter); Goldstream (Blackmore); Wellington (Bryant); Fraser Mills (Marmont); Kaslo (Cockle); and Rossland (Danby); the dates ranging from June 16th to July 26th.

The three species are superficially very close, but *delawaricus* can be separated from *tenuidactylus* and *ningoris* by the second joint of the labial palpi having a projecting ventral tuft which nearly reaches the tip of the third, and *tenuidactylus* can be distinguished from *ningoris* by the position of the median spurs on the hind tibiæ. In *tenuidactylus* these spurs are attached to about the middle of the tibiæ, while in *ningoris* they are attached three-fifths or more of length of joint from its base.

Genus PLATYPTILIA Huebner.

Platyptilia Hüebner, Verz. bek. Schmett., 429, 1826. Characters: Front with a prominent scale tuft in some species, usually with at least a moderate tuft. Palpi short, scarcely exceeding front, to long; second joint oblique; third porrect. Tibiæ sometimes with slight scale-tufts. Fore wings cleft not more than one-third their length, anal angle evident on both lobes, in some species prominent and in some retreating. Hind wings trifid, third feather with black scales or scale-tuft in fringes of inner margin in most species.

1. PLATYPTILIA PUNCTIDACTYLA Haworth, Lep. Brit., 479, 1812.

Alucita cosmodactyla Hüebner, Samml. Eur. Schmett., 35, 1823.

Primaries brownish-grey to olive-black, with a very variable superficial white irroration. Costa with white dots on a blackish ground running from base of wing to cleft. A black triangle, paler on the costa, reaches just beyond base of cleft. Third feather of secondaries with black scales along inner margin, a large triangular scale-tooth just beyond middle and a small tuft at apex. Expanse, 20–23 mm.

This is the *cosmodactyla* of our previous lists, which Meyrick places as a synonym of *punctidactyla*. Although only previously recorded from Kaslo, it is widely distributed, as I have it from Victoria (Blackmore); Fitzgerald (Carter); Goldstream (Blackmore); Duncan (Day); Wellington (Bryant); Fraser Mills (Marmont); Lillooet (Phair); Mount McLean (Hanham); Fort Fraser (Anderson); Kaslo (Cockle); and Chilcotin (Buckell). The species extends as far east as Manitoba, south to Illinois, Colorado, and South California. It also occurs in Europe and Japan. It feeds on a number of food-plants; Meyrick (Handb. Brit. Lep., 433, 1895) gives *Stachys*, *Aquilegia* and *Geranium* as the European food-plants. Dyar records it from Kaslo as feeding in the red bracts of the high-bush honeysuckle (*Lonicera involucrata*). Mr. Cockle bred specimens from the Indian paint-brush (*Castilleja*) in 1907.

2. PLATYPTILIA PICA Walsingham, Pter. Cal., Ore., 21, 1880. Primaries white to well beyond base of cleft, followed by a black shade which terminates at the usual transverse white lines on the two lobes. Costa black with white spots and a heavy black triangle before cleft. Terminal area brownish with white scales which sometimes cover the darker colour. Third lobe of secondaries much as in the preceding species. The abdomen offers the only constant distinguishing feature. Its upper surface is marked with a large white triangle on each segment, apex forward, and the last few segments are almost entirely white. Beneath it is broadly white in its distal half. Expanse, 18–24 mm.

This species is rather uncommon, the specific localities being Victoria (Carter); Fitzgerald (Blackmore); Duncan (Day); and Wellington (Bryant). It has not been recorded from the Mainland as yet. The types were taken at Crescent City, North California, and it has been taken at Seattle and Mount Rainier, Wash.

The species varies considerably and in some cases closely approaches *punctidactyla*. The two species, however, can always be separated by the white triangles on the abdomen as noted above.

3. PLATYPTILIA TESSERADACTYLA Linnæus, Faun. Suec., 370, 1761. Primaries rather evenly greyish, the markings produced by variation in the mixture of white scales, and therefore powdery and indefinite. Costa darker, dotted with white, with the usual dark triangle before cleft, sometimes very vague. Outer transverse white line present, incomplete on second lobe. Secondaries with dark scales at tip of each lobe and a weak tuft of approximately equal dark scales just beyond middle of inner margin of third lobe. Palpi small, scarcely exceeding front. Thorax white behind. Expanse, 16–20 mm.

This is apparently a rare species in the Province. In Dyars "Kootenai List" he records two specimens—Bear Lake Mountain (July 29th) and Kokanee Mountain (August 11th). None have been recorded since until this year. Mr. R. S. Thomson, who was with a surveying party in the mountains some 10 miles from Princeton, captured a single pterophorid which was deter-

mined by Dr. Lindsey as this species. In Mr. M. Ruhmann's material there is a single specimen labelled Vernon, but without date. The species occurs in Eastern Canada and the Atlantic States, extending west to Pennsylvania and Colorado. It also occurs in Europe and West Central Central Asia.

4. Platyptilia carduidactyla Riley, Rept. Ins. Mo., 180, 1869. Primaries brownish-buff, with the costa dark brown dotted with white as far as the usual brown triangle, which is much the darkest part of the wing. The heavy triangle contains a dark transverse dash before cleft which is visible only in pale specimens; both lobes pale brown crossed by a vague light line toward outer margin. Fringes grey-buff with a row of brown scales in base along outer margin, grey tufts at apices and anal angles, and two dark-brown scale-tufts on inner margin. Secondaries grey-brown, fringes slightly paler, with short dark scales at apices of first two lobes. Fringes of inner margin of third lobe with a prominent triangular tooth of dark-brown scales at middle. This tooth is preceded and followed by a variably complete row of short, dark scales and the lobe is whitish before it. Frontal tuft moderate, blunt, surpassed by third joint of oblique palpi. Expanse, 20–27 mm.

This is one of our commonest species and is widely distributed. I have specimens from a large number of localities; from Vancouver Island to Rossland and from Prince Rupert to Vavenby. It occurs all throughout the United States and has been taken at Labrador. According to Riley, the larvæ are gregarious, living in webbed heads of common thistles.

5. Platyptilia percnodactyla Walsingham, Pter. Cal., Ore., 8, 1880. The general appearance of this species is substantially the same as the preceding, differing chiefly in the greatly reduced scale-tuft on the third lobe of secondaries.

In *carduidactyla* this scale-tooth is distinctly triangular; in *percnodactyla* it is often very weak and made up of scales of approximately equal length. They may be forms of one species, but the early stages of *percnodactyla* are unknown. Careful breeding may clear up the standing of the species. Specimens which have been definitely determined as this species are from Victoria (Carter); Goldstream (Blackmore); Wellington (Bryant); and Mount McLean (Day and Hanham).

6. Platyptilia edwardsii Fish. Can. Ent., XIII., 72, 1881. Primaries buff, frequently tinged with brown and hoary with whitish scales, the buff appearing only in the pale markings and along the inner margin. The usual dark triangle is blackish-brown. Brown shade continued along costa to base, towards which it becomes faint. Brown spot in cell is usually connected with costa. Inner margin frequently with brown shades. Both lobes with pale outer line, incomplete on second, preceded by a heavy brown shade which blends into buff or greyish towards triangle. Terminal area hoary with whitish scales over brown. Secondaries grey-brown, third lobe having scattered brown scales on inner margin and a variable but always weak tuft of slender, almost equal brown scales within outer third of feather. Thorax somewhat hoary, whitish behind. Palpi moderate, oblique, scarcely exceeding the short, conical frontal tuft. Expanse, 19–29 mm.

This is apparently a high-altitude species in British Columbia and has only been taken in a few localities—Hope Mountains (Day); Mount McLean (Hanham and Day); Kaslo (Cockle); Rossland (Danby); and Mount Cheam (Harvey). The types were taken at Boston and Amherst, Mass., and it also occurs on Mount Rainier, Wash.

Edwardsii can always be separated from the two preceding species by the scale-tooth on the inner margin of the third feather of secondaries being always placed at the outer third, while in *carduidactyla* and *percnodactyla* it is in the middle of the lobe. In addition, the species is considerably darker in appearance and generally larger, although all three species vary considerably in size.

7. Platyptilia orthocarpi Walsingham, Pter. Cal., Ore., II., 1880. Primaries ochreous along inner margin, mixed brown and white with a few ochreous scales toward costa. Costa itself narrowly blackish-brown with white dots. Dark triangle before cleft. Terminal area brown, hoary with white scales, preceded by a faint transverse pale line, less complete on second lobe. Spaces between this and triangle ochreous irrorate with white, with an elongate triangular brown dash and costal shade on first lobe and two dashes on second. Cleft margined with a few dark scales. Secondaries brown, third lobe more ochreous. Fringes greyish with white bases along inner margins and at apices of first two lobes; containing a few brown scales in basal half of third lobe. Palpi brownish ochreous, moderate, oblique, touched with white above

and below. Thorax mostly whitish in front and behind, brownish ochreous across tips of patagia. Expanse, 20–26 mm.

A very rare species. There is only one record from British Columbia—a single specimen taken by Mr. G. O. Day in June. The type came from Northern Oregon, where they were reared from a species of *Orthocarpus*. Writing of *orthocarpi*, Barnes and Lindsey state that "Together with *fragilis*, *shastæ*, and *albida*, they make up an extremely difficult group which we are inclined to believe in a state of evolution. The named forms can be recognized, but whether to regard them as forms and races of one species or as distinct species is a question which we are unable to decide."

8. PLATYPTILIA FRAGILIS Walsingham, Pter. Cal., Ore., 16, 1880. In this species the characters are much the same as in the preceding, except that the general colour is more or less buff or light brown. Expanse, 20–24 mm.

In the Bryant collection several specimens stood under the name of *fragilis*, but upon examination they all proved to be *albiciliata* Wals., with the exception of one specimen, which Dr. Lindsey agrees is *fragilis*. The specimen is a little undersized, barely measuring 18 mm. It lacks antennæ and abdomen, but is otherwise in good condition. It was taken by Mr. Bryant at Wellington on July 13th, 1903. The species occurs in Washington, California, Arizona, and Colorado.

9. PLATYPTILIA ALBICILIATA Walsingham, Pter. Cal., Ore., 17, 1880. Fore wings even dull brown, dark triangle faintly indicated. Fringes greyish with pale bases which bear a row of dark scales on the outer margin. Secondaries are concolorous, their fringes with pale bases, sometimes conspicuous, and a few scattered brown scales along the inner margin of the third lobe. Expanse, 21 mm. Thorax somewhat lighter behind. Palpi are moderate, oblique, and the frontal tuft very short and blunt.

British Columbia examples differ from the above abbreviated description, in having the dark triangle well marked and the outer pale line discernible on the first lobe in most specimens. There is also some irroration of bluish-white scales on the disk and along the costal edge; in some specimens this irroration is extended to the terminal area of both lobes of the primaries. The species has been taken at Wellington (Bryant); Mount McLean (Day); and at Barkerville (Buckell). The single specimen taken by Mr. Buckell is a darker brown than the other British Columbia specimens and of a more even colour. The species was described from North California. There is a specimen from Montana in the Barnes collection which is doubtfully referred to this species. The early stages are unknown.

10. PLATYPTILIA ALBICANS Fish, Can. Ent., XIII., 71, 1881. Primaries creamy white with white-irrorate brown areas, the colours about equally extensive. Both lobes with a terminal brown band and one just before middle which fades out toward inner margin. Costa brown as far as base of cleft and inward to a transverse dash before cleft. Fringes white with grey tips; brown and white scales in bases along outer margin. Secondaries grey-brown with a faint tuft of slender scales, not visible without lens, near middle of inner margin of third lobe. Expanse 17–24 mm. Frontal tuft lacking. Palpi small and slender, but projecting well beyond front; brownish on sides.

The only records for British Columbia are specimens taken by Mr. G. O. Day. One taken at Hope Mountains in July, 1908, and another one taken on Stokers Mountain, near Cowichan Lake, on July 23rd, 1909. Writing on the species, Barnes and Lindsey remark "that the Stoker Mountain specimen is anomalous. We place it here with little hesitation, though it is so much darker than the typical form that a casual examination discloses little resemblance. It corresponds in essential features with our series, but differs in having the brown areas darker and more extended, the pale areas consequently narrow and somewhat tinged with brown."

The species was described from Nevada and has been taken at Wyoming and Colorado. The early stages are unknown.

11. PLATYPTILIA PALLIDACTYLA Haworth, Lep. Brit., 478, 1812. Primaries with nebulous bright-brown and whitish markings. Cleft preceded by two brown dots. Pale areas a blotch in cell, preceded by a brown dot, one near inner margin about one-third from base, and a broader area below base of cleft. Lobes paler brown, crossed by a pale line outwardly and with a pale area on costa above base of cleft, before which costa is narrowly dark brown, dotted with white. All brown areas slightly irrorate with white. Secondaries brown. Fringes of inner margin of third lobe with pale bases and usually with a faint cluster of slender dark scales just beyond

middle. Expanse 21–26 mm. Frontal tuft about as long as head, sharply pointed. Palpi long, slender, porrect, noticeably surpassing tuft.

Our British Columbia specimens agree with the above description, excepting in the faint cluster of slender dark scales on the inner margin of third lobe. In all the specimens I have examined the cluster is absent, but in most of the specimens there are a few scattered dark scales, mostly in the basal half. I have it from Victoria (Carter); Goldstream (Day and Blackmore); Vernon (Ruhmann); and Kaslo (Cockle). I found it not uncommon at Goldstream in June. It apparently ranges over the entire North American Continent north of 37° latitude, and also occurs in Europe.

12. Platyptilia albertæ Barnes and Lindsey, Cont. Lep. No. Amer., Vol. IV., No. 4, 346, Aug., 1921. Primaries white. Costa narrowly brownish-grey to cleft. Cleft preceded by two dark dots; a third similar dot in middle of cell. Lobes with terminal and median greyish shades defining the broad outer white line. Fringes white, basal scales on outer margin white. Secondaries very light brownish-grey, fringes and third lobe paler. Expanse 24–27 mm.

The shape of the primaries is distinctive. Towards the apex the costa is abruptly rounded, the apex is very blunt, and the outer margin of the first lobe almost straight. The first lobe and consequently the entire wing looks very wide and blunt. Frontal tuft as long as head, sharply pointed. Palpi moderate, oblique surpassing front, but not reaching end of tuft.

The species was described from four specimens, as follows: Holotype female, Laggan, Alta., August 16th to 23rd, and one paratype female, Olympic Mountains, Wash., in Coll. Barnes. Allotype male, Mount Cheam, B.C., August, in Coll. Blackmore. Paratype female, Laggan, Alta., August 16th to 23rd, in U.S. National Museum.

The Mount Cheam specimen was taken by the late Captain R. V. Harvey in August, 1903. Among some material sent by Mr. Cockle, of Kaslo, for examination were two specimens of this new species. Both of them are rather worn and one is without abdomen; the latter, presumably taken at Kaslo, is without date. The other specimen was taken at Sandon on August 9th, 1904.

Unfortunately the wings have a tendency to stain easily and in the allotype they are more or less tawny. It is evidently a high-altitude species.

Genus STENOPTILIA Huebner.

Stenoptilia Hüebner, Verz. bek. Schmett., 430, 1826. Front with a rounded or conical prominence or a scale-tuft. Ocelli present. Palpi various. Primaries bifid, cleft from about two-thirds. Secondaries trifid, third feather without dark scales in fringes of inner margin. Anal angles of both lobes of primaries very retreating. Very closely allied to the preceding genus, but can be separated from the greater part of *Platyptilia* by the lack of dark scales in the fringes of the secondaries and from the remainder by the retreating anal angles.

1. Stenoptilia mengeli Fernald, Pter. No. Amer., 60, 1898. Primaries ashy-grey and glistening; a few dark fuscous scales on the first lobe form an ill-defined longitudinal stripe on the middle; a fuscous spot at the end of the cleft. Hind wings ashy-grey. Expanse 20 mm. Thorax and palpi dark ashy-grey. A fine white line occurs over each eye.

A single specimen taken by Mr. A. W. Hanham on Mount McLean in August constitutes our only record. It is a rather surprising capture, as very few specimens are known. It was described from ten poor specimens taken by Mr. W. L. Mengel at McCormack's Bay, North Greenland in 1891. Barnes and Lindsey record a single specimen from Colorado which is slightly paler than the types. The latter specimen is in the U.S. National Museum. This is apparently all that are known.

2. Stenoptilia exclamationis Walsingham, Pter. Cal., Ore., 32, 1880.

Stenoptilia coloradensis Fernald, Pter. No. Amer., 61, 1898.

Primaries dark brownish-grey on costa, blending into ochreous or pale grey on inner margin, and irrorate with white in most specimens. The white scales are heaviest on the terminal area of both lobes. Cleft preceded by two blackish dots, usually fused. First lobe with a heavy blackish shade, margined outwardly with white and preceded on costa by a white dash. There is usually a blackish dot near middle of cell. Fringes white in cleft, with greyish clusters before outer margin, elsewhere grey, white below apices of both lobes. Secondaries brownish-grey with concolorus fringes. Expanses, 18–24 mm. (British Columbia examples are more consistent in size, measuring 22 mm.) Palpi moderate, whitish above; third joint small; a white line over each eye.

A rather uncommon species in the Province. I have it from Fitzgerald (Carter) and Fraser Mills (Marmont), and have seen a specimen from Kaslo (Cockle). The species occurs in Manitoba and Ontario. The types of *exclamationis* came from the Siskiyou Mountains, North California, and the types of *colorandensis* were taken in Colorado. Barnes and Lindsey, who have examined the types, consider them conspecific. The early stages are unknown.

Genus ADAINA Tutt.

Adaina Tutt, Ent. Rec., XVII., 37, 1905. Ocelli obsolete. Palpi moderate, ascending, slender. Primaries cleft from two-thirds or before. Secondaries trifid, third feather without black scales in fringes. Very close to *Oidæmatophorus*, but differs chiefly in venation of primaries, as a reference to the figures on Plate V. will show. The cleft in primaries is also cut more deeply, thus making the lobes longer in proportion.

1. ADAINA MONTANA Wals. form DECLIVIS Meyrick, Exot. Microlep., I., 112, 1913. Primaries cleft to three-fifths, lobes rather narrow, equal, pointed; white, sometimes mixed with light-brownish suffusion; basal half with a few scattered dark fuscous scales; a moderate oblique fascia of dark fuscous irroration from costa beyond base of cleft to middle of inner margin. Both lobes more or less sprinkled with dark fuscous. Fringes white on inner margins of both lobes, brownish towards apices. Secondaries rather dark grey with fringes paler. Expanse 16 mm. Thorax white, posterior half sometimes light brownish, abdomen white, sometimes with faint brownish dorsal lines. (The British Columbia example has the posterior half of the thorax and the abdomen a light ochreous.)

One specimen in fair condition taken by Mr. W. B. Anderson at Fort Fraser on September 16th, 1921.

The species was described from two specimens taken at Toronto, Ont., in August. It also occurs in Manitoba. It has been reared in Colorado by Dyar and Caudell in the heads of *Helianthus pumilus*.

Genus OIDAEMATOPHORUS Wallengren.

Oidæmatophorus Wallengren, Skand. F-jiid., 19, 1859.

Pterophorus Wallengren (not Geoff.), *ibidem*, 20, 1859.

Front rarely with tuft. Ocelli obsolete. Palpi short to long, usually slender, and more or less oblique. Tibia with or without conspicuous scale-tufts. Primaries cleft two-fifths or less. Secondaries trifid, fringes without black scales.

Writing of this genus, Barnes and Lindsey state, in part, that "The species of *Oidæmatophorus* are not at all difficult to identify when one has gained some familiarity with them. Usually some one or two characters suffice, but we have found that very nearly all characters of colour and pattern are subject to such variation that the construction of a key is very difficult."

As there are sixty species of this genus in North America, many of which are closely allied, the authors prepared a key combining structural characters together with those of coloration and maculation. A number of species were inserted under two categories so as to make use of the most salient features.

As only eleven of these species occur in the Province, I have constructed a key based (with the exception of *monodactylus* Linn.) on the colour and pattern of the wings alone, which I think will suffice for the identification of most of our British Columbia species of this genus.

Key to the Species.

1. Primaries white or whitish 2
   Primaries light ochreous to tawny 4
2. Primaries white with scattered dark-brown irroration; a dark-brown costal patch over base of cleft .....2 *mathewianus*
   Primaries whitish 3
3. With a wide dark-brown diskal streak from base to cleft; oblique costal patch over base of cleft .....5 *fieldi*
   With wide tawny streak on costal margin of first lobe; fringes on primaries brown, contrastingly darker than wing. No costal patch ....6 *phœbus*
4. Primaries tawny with heavy brown costal mark over base of cleft; small brown shade before cleft .....1 *occidentalis*
   Primaries light ochreous; a blackish-brown rounded spot a short distance before cleft and another fainter one above it, sometimes connected by a faint line .....7 *helianthi*

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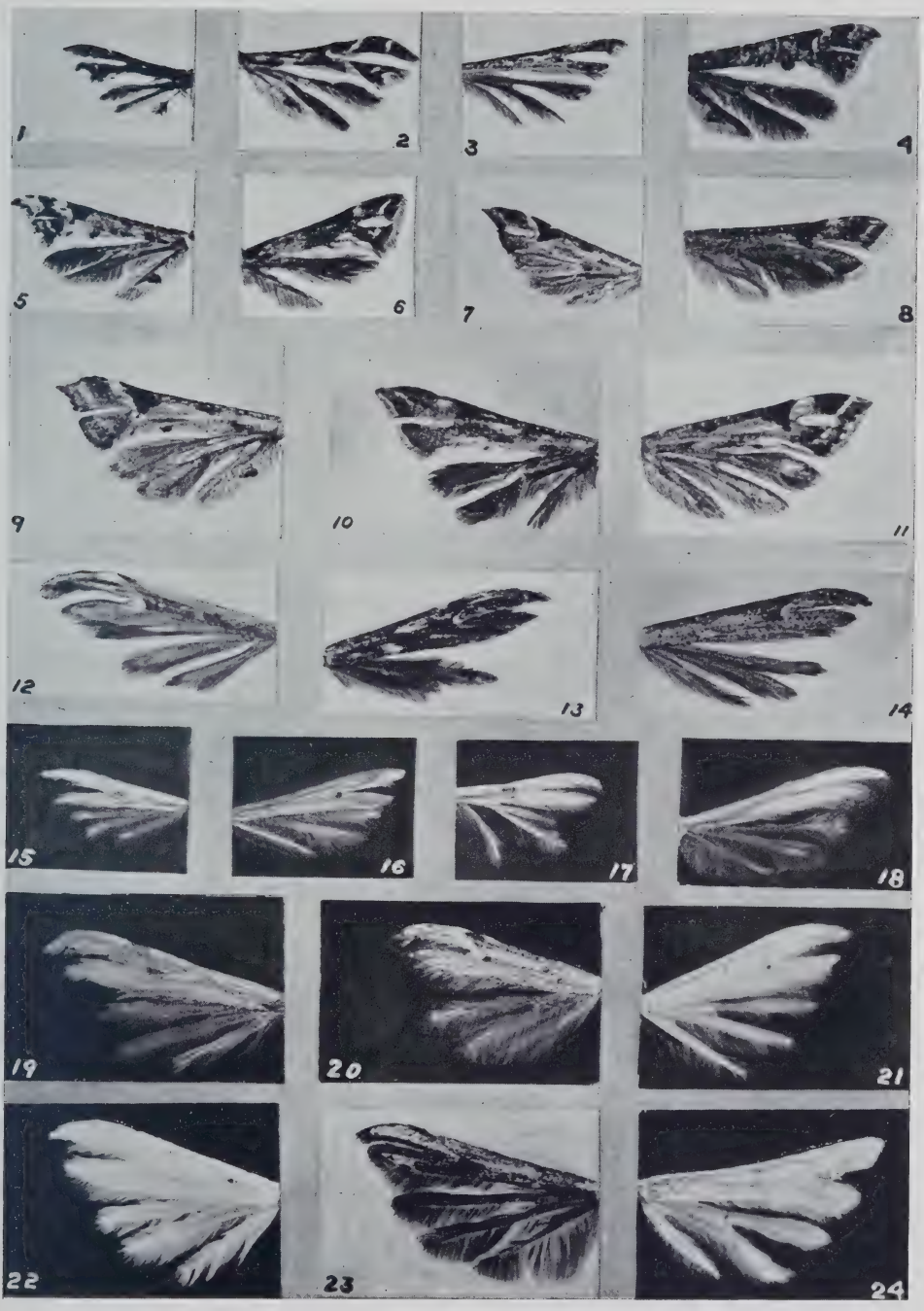
PLATE VI.

PTEROPHORIDÆ.

1. *Pterophorus tenuidactylus* Fitch. Quamichan Lake, B.C.
2. *Pterophorus delawaricus* Zell. Fraser Mills, B.C.
3. *Stenoptilia exclamationis* Wlsm. Fraser Mills, B.C.
4. *Platyptilia punctidactyla* Haw. Kaslo, B.C.
5. *Platyptilia pica* Wslm. Victoria, B.C.
6. *Platyptilia tesseradactyla* Linn. Vernon, B.C.
7. *Platyptilia fragilis* Wlsm. Wellington, B.C.
8. *Platyptilia albiciliata* Wlsm. Wellington, B.C.
9. *Platyptilia carduidactyla* Riley. Victoria, B.C.
10. *Platyptilia pallidactyla* Haw. Goldstream, B.C.
11. *Platyptilia edwardsii* Fish. Mount McLean, B.C.
12. *Oidæmatophorus fieldi* Wright. Atlin, B.C.
13. *Oidæmatophorus grisescens* Wlsm. Kaslo, B.C.
14. *Oidæmatophorus cinereaceus* Fish. Alberni, B.C.
15. *Adaina montana declivis* Meyr. Fort Fraser, B.C.
16. *Stenoptilia mengeli* Fern. Mount McLean, B.C.
17. *Oidæmatophorus corvus* B. &. L. Goldstream, B.C.
18. *Oidæmatophorus straminœus* Wlsm. Kaslo, B.C.
19. *Oidæmatophorus occidentalis* Wlsm. Vavenby, B.C.
20. *Oidæmatophorus mathewianus* Zell. Kaslo, B.C.
21. *Oidæmatophorus helianthi* Wlsm. Kaslo, B.C.
22. *Oidæmatophorus homodactylus* Wlk. Mount McLean, B.C.
23. *Oidæmatophorus monodactylus* Linn. Victoria, B.C.
24. *Platyptilia albertæ* B. & L. Kaslo, B.C.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5. Species smaller. Primaries pale yellow or yellow-tinged 6
Not such species 7
6. Primaries definitely yellowish; generally with a heavy tawny shade from base to first lobe. Expanse, 15–21 mm. .....9 *stramineus*
Primaries pale greyish-yellow; a greyish-brown shade generally present in first lobe. Secondaries conspicuously darker. Expanse 17–20 mm. .....10 *corvus*
7. Entirely snowy white .....8 *homodactylus*
Primaries grey, powdered with blackish-brown and white scales; inner margin conspicuously brownish .....3 *grisescens*
Primaries ash-brown to ash-grey, generally heavily irrorated with blackish scales. Base of cleft white preceded by a blackish triangular mark connecting with a dark costal dash .....4 *cineraceus*
Primaries variable; from tawny to red-brown and grey; anal angle of second lobe with extremely long fringes. Hind tarsi with a conspicuous dorsal crest on upper surface ..... 11 *monodactylus*

1. Oidæmatophorus occidentalis Walsingham, Pter. Cal., Ore., 37, 1880. Primaries creamy white to deep ochreous, normally with a heavy brown costal mark over base of cleft, preceded and followed by a few whitish scales. This patch is connected with a small brown triangular shade before cleft. The wing is marked with cloudy brown areas and the first lobe is light brown. Fringes even tawny-grey. Secondaries brownish, shining with paler fringes. Expanse 26–29 mm. Head with a pale patch between antennæ, otherwise the darkest part. Thorax concolorous with primaries, paler behind. Palpi rather small, oblique; second joint thickened, white-tipped. Front tibiæ with a heavy double tuft of brown scales in terminal half, mid-tibiæ with heavy median and terminal tufts of the same colour. Inner spur of median pair on hind tibiæ almost twice as long as outer. A very variable species.

The records in British Columbia are from Kaslo (Cockle); Rossland (Danby); Vavenby (Moilliet); and a rather worn specimen from Fort Steele (W. B. Anderson). The type series was taken in California and it occurs in Arizona and Utah.

2. Oidæmatophorus mathewianus Zeller. Verh. Zoot.-bot. Ges. Wien., 445, 1874. Primaries white with variably extensive tawny brown shades, usually confined to inner half, but sometimes encroaching on first lobe. Costa with scattered dark-brown scales forming a long spot over base of cleft and two white dots beyond. Cleft preceded by a white area, and this by a dark-brown dash continued obliquely to costal spot by a light-brown shade. Sometimes a dark dot near middle of cell and some scattered patches of dark-brown irroration. Inner margin of first lobe with a brown dot before apex, followed by a white pencil in the fringe. Fringes light brownish-grey with some white hairs. Secondaries brownish-grey. Expanse 21–27 mm. Head, thorax, and abdomen white. Palpi short, oblique, brown-speckled. Front tibiæ with a large brown scale tuft; mid-tibiæ with two heavy brown tufts; hind legs white.

Described from Vancouver Island. I have not seen any specimens from the Island, although extensive collecting has been done on the southern portion of the Island, neither are there any specimens in the Bryant collection from Wellington. A short series was taken in August by Messrs. Day and Hanham on Mount McLean, and three specimens sent to me by Mr. Cockle, of Kaslo, as *Petrophorus brucei* Fern. turn out to be this species. Mr. Day records a specimen of this species taken by his son at Dawson, Yukon Territory, in 1910. It occurs in Southern California, and Barnes and Lindsey refer to this species specimens taken in Colorado and Maine which differ from typical specimens, but agree in all essential features.

3. Oidæmatophorus grisescens Walsingham, Pter. Cal., Ore., 34, 1880. Primaries narrow, heavily sprinkled with white, and with some scattered blackish scales. Ground colour of inner half, brown; of costal half, apparently grey-brown, the scales tipped with white; but this area of the wing is greyish-white because of the predominating white scales. Costa with a grey-brown dash over base of cleft and two spots beyond. Cleft preceded by a white patch, and this by a small blackish spot curving forward to costal dash in a slender line. First lobe with a black dot before apex, followed by a white pencil in the fringes. Fringes brownish-grey with a mixture of white hairs. Secondaries grey-brown with concolorous fringes. Expanse 23–30 mm. Head and thorax clothed with grey-tipped white scales. Palpi short, oblique, each joint white-tipped. Abdomen whitish with brown-tipped scale tufts on posterior margins of segments.

One specimen taken by Mr. Cockle at Kaslo on August 1st, 1907. This is a very distinct species and cannot be confused with any other British Columbia species. Type series were reared from *Artemisia* sp. at Rogue River, Southern Oregon. It also occurs in California, Colorado, and Arizona. Barnes and Lindsey also record a specimen from "British Columbia (June)," but no specific locality is given.

4. OIDÆMATOPHORUS CINERACEUS Fish., Can., Ent., XIII., 73, 1881. Primaries brownish-white to greyish, often darker toward costa. There is a variable irroration of blackish scales which tends to collect between the veins and in the basal half of the wing. Whitish at base of cleft, preceded by a brown dash which curves outward to brown costal dash above base of cleft. Fringes brownish-grey with a few white hairs. Secondaries grey-brown with fringes, concolorous. Expanse 27–29 mm. Palpi short, oblique. Abdomen brownish-white, with central dark dots in distal half.

Not uncommon and widely distributed. Recorded from Duncan (Day); Wellington (Bryant); Alberni (Redford); Mount McLean (Day); Kaslo (Cockle); and Vaveuby (Moilliet). We have not seen the species from either Victoria or Goldstream.

Our British Columbia specimens are very even in their colouring, all that I have seen being of the typical brownish-white form. The irroration of the blackish scales is, however, very variable. The species occurs in Washington, California, Colorado, Utah, Pennsylvania, and Manitoba. The life-history is unknown.

5. OIDÆMATOPHORUS FIELDI Wright, Ent. News. XXXII., 6, 1921. Primaries: Ground colour white; the costal edge, discal area from base to cleft, and inner margin broadly brown-streaked. A dark-brown costal streak just above the base of the cleft, connected broadly with the outer end of the discal streak, preceded and followed by white; another brown costal streak at the base of the first lobe, then narrowly white to apex. A white spot preceding base of cleft, connected obliquely by a fine white line to the outer costal white spot. Second lobe brown at tip, faint brown line down the centre, and a small square white spot one-third from base. Fringe smoky, darker within the cleft. Secondaries dull smoky brown, fringes darker. Expanse 21–26 mm. Palpi mottled light brown and white. Thorax dorsally brown; anterior part, buff. Abdomen light brownish-buff on anterior part, becoming almost seal-brown mottled with lighter on the anal segments.

Two specimens from Atlin. One is from the Bryant collection without date and the other was taken by E. M. Anderson on July 19th, 1914. They are both rather faded and a little worn. Dr. Lindsey made a slide of the genitalia of the latter to ensure the identification. Barnes and Lindsey also record a specimen from Wellington (Taylor) which is paler than typical. The type series was taken at San Diego, Cal., so that the species has an extensive range; it is also recorded from Arizona.

6. OIDÆMATOPHORUS PHOEBUS Barnes and Lindsey, Cont. Lep. No. Amer., Vol. IV., No. 4, page 406, 1921. Primaries whitish to light tawny brown, the palest area in the second lobe and along inner margin of first. Costa whitish towards base, sprinkled with blackish scales, paler towards apex. Cleft preceded at a short distance by a faint dark dot. Entire wing usually with some scattered black scales, tending to form streaks in the lobes and near the inner margin. Fringes pale on costa, elsewhere brownish-grey to brownish-black, contrastingly darker than wing. Secondaries brownish-grey with slightly darker fringes. Expanse 21–23 mm. Head brown with a whitish band between antennæ. Thorax whitish in front, becoming tawny behind. Palpi small, oblique, whitish, with traces of brown on third joint.

Described from four specimens from various localities in California. With these the authors have associated a specimen from New Westminster, which, however, is much paler than the type series. Neither the date of capture nor collector's name is given. Among the material sent from Kaslo was a specimen which was different to anything else that I had seen; it was submitted to Dr. Lindsey, who pronounced it this species. It was taken by Mr. Cockle on June 22nd, 1910.

7. OIDÆMATOPHORUS HELIANTHI Walsingham, Pter. Cal., Ore., 54, 1880. Primaries brownish —white to tawny with some scattered dark-brown scales. A short distance before the cleft and slightly toward inner margin there is a rounded dark-brown spot, well defined, which may be extended as much as half-way to the costa by an oblique line of dark scales, and occasionally the anterior extremity of this mark alone is evident as a spot much more vague than the first (this is the case in the British Columbia example before me) apex and inner margin of first

lobe with a row of dark dots. Fringes concolorous, those in cleft with dark areas just before apices of both lobes. Secondaries grey-brown, bases paler; fringes slightly more tawny. Expanse 21–29 mm.

The only record of this species in British Columbia are some specimens taken at South Fork, Kaslo Creek, by Mr. Cockle on August 10th, 1903. Other specimens sent by Mr. Cockle from Kaslo as this species are worn specimens of *occidentalis*. The type series was taken in the Siskiyou Mountains, South Oregon, and were bred from larvæ feeding on a species of *Helianthus*. The species has also been taken in Colorado.

8. Oidæmatophorus homodactylus Walker, List. Lep. Ins. Brit. Mus., XXX., 941, 1864. Primaries snowy white, in some specimens with a slight irroration of brownish-grey in costal half. Cleft sometimes preceded at a short distance by a small brownish dot. Secondaries tinged with greyish. Head, thorax, and abdomen snowy white. The mid-tibiæ have a fringe of scales down the inside, but no tufts.

It is evidently a mountainous species in this Province, as our records are from Hope Mountains, July (Day and Harvey); Mount McLean, August (Day and Hanham); and Vavenby, August (Moilliet). The Mount McLean specimens were taken at an elevation of 5,000 feet. The species occurs throughout Canada from British Columbia to Quebec, south into New Jersey and Illinois. It has also been taken in California.

9. Oidæmatophorus stramineus Walsingham, Pter. Cal., Ore., 41, 1880.

Lioptilus augustus Walsingham, Pter, Cal., Ore., 43, 1880.

Primaries usually yellow or yellowish, occasionally somewhat ochreous. There is at least a trace of a brown spot contiguous to the base of the cleft; in some specimens this spot is well marked. In most specimens a heavy brown shade runs from the base next to the inner margin into the first lobe. Fringes more greyish. Secondaries greyish with fringes concolorous. Expanse 15–21 mm. Thorax yellow. Abdomen yellow with brown dorsal stripes. Palpi slender, moderate, oblique; tips of second and third joints touched with fuscous outside.

This is the species that is listed as *stramineus* in our local lists. *Stramineus* was described from specimens taken in the Siskiyou Mountains, South Oregon, in June, and *augustus* from a series taken on Mount Shasta, California, in August. The types are in the British Museum. Mr. Edw. Meyrick has compared specimens with the types for Messrs. Barnes and Lindsey, and the latter have also compared specimens with Fernald's paratypes and are unable to find any specific differences between them. The species is very variable in appearance, due to the inconstancy of the brown shade on the primaries. Mr. Day has taken a specimen at Quamichan Lake, near Duncan, the only record we have for Vancouver Island. The same collector also took the species in the Hope Mountains in 1908. Mr. Cockle has it from Kaslo and Dr. Dyar took a long series at Ainsworth in June and July, 1903. In his note on the species Dyar states that "The moths were easily started up from low grass and weeds, but especially from the plant *Anaphalis margaratacea*, which I suppose is their food-plant. Larvæ were found commonly in the flower-heads of this plant, but unfortunately were not bred."

10. Oidæmatophorus corvus Barnes and Lindsey, Cont. Lep. No. Amer., Vol. IV., No. 4, page 427, 1921. Primaries clear pale yellow in the lightest specimens, with some brown scales near base, sometimes a small brown dot a short distance before base of cleft, and sometimes a brown sub-costal shade which meets the costa in the first lobe. In the type series these wings have a pale-yellowish or greyish-yellow costal band from base to a point opposite base of cleft, in which the extreme costal margin bears some brown scales. Behind this the entire wing is clothed with brownish-grey mixed with very pale-yellowish scales, becoming more whitish toward inner margin. The spot before the cleft is faintly marked and is continued slightly toward costa to form a transverse shade. Costal fringes on first lobe yellowish, others dark greyish. Secondaries brownish-grey fringes concolorous. In pale specimens the secondaries appear dark in contrast to the yellow primaries. Expanse 17–20 mm. Palpi moderate, slender, oblique, yellowish-white with a brown outer line. Thorax pale yellow. Abdomen pale yellow to pale greyish-yellow with a fine light-brown dorsal line.

This new species was described from twenty specimens taken at Tuolumne Meadows and Deer Park Springs, Lake Tahoe, California. It has also been taken in Washington and Colorado.

It is apparently widely distributed in British Columbia, specific localities being Goldstream (Blackmore); Wellington (Bryant); Fraser Mills (Marmont); Kaslo (Cockle); and Cranbrook (Garrett).

The British Columbia specimens are very variable, both in size and in coloration. The Wellington examples are the largest, being 21–22 mm. in expanse, with the dark shades contrasting with the paler areas, which are a deep cream. A series from Goldstream average 18 mm. in expanse and are very pale, the ground colour being a sordid white, with the brown spot before cleft distinctly marked. Those from Fraser Mills are similar, but not quite so pale. Some Kaslo specimens are as pale as my Goldstream series, but a trifle smaller, although one specimen is larger than any, measuring 23 mm., and in addition is very much darker, the ground colour being dark brown. Dr. Lindsey has seen this specimen and pronounced it *corvus*, believing that the brown colour is due to age or some other cause. It was taken on June 20th, 1904.

The life-history and food-plant are unknown, although the series which I took at Goldstream in August, 1920, were all beaten from the common yarrow (*Achillia millefolium*), which may be its food-plant. I did not observe it on any other plant.

11. OIDÆMATOPHORUS MONODACTYLUS Linnæus, Syst. Nat. (Ed. 10), page 542, 1758. The colour of the primaries is very variable, ranging through shades of grey, yellow, and brown to various mixtures of these colours. The fore wings are very narrow, but have unusually long fringes at the anal angle of the second lobe. There is a black spot before base of cleft, sometimes extended to it, a dot in cell, some at tips of veins in both lobes, and some black scales streaking the wing near inner margin. Secondaries and fringes of both wings brownish-grey. Expanse 21–28 mm. Thorax similar to primaries. Abdomen brownish or greyish with some dark dashes, and a narrow dorsal stripe concolorous with thorax, which widens anteriorly and is usually margined with white toward its junction with the thorax. There is usually a crest of scales present on the upper surface of the hind tarsi.

This is our commonest species on Vancouver Island and it has been taken in every month of the year. The most common coloration is tawny, with a sprinkling of grey forms and a few red-brown ones. I have not seen any specimens from the Mainland, which is rather surprising, as it occurs right across the continent from the Atlantic to the Pacific and from Mexico to Canada. It also occurs in Europe, Asia, and North Africa. It feeds on a large number of different food-plants.

The following eight species recorded in the 1906 B.C. Check-list are omitted from this paper for the reasons given:—

Trichoptilus lobidactylus Fitch. Recorded from Wellington. I have examined the specimens labelled as this species in the Bryant collection and from which the records were taken for the above list, and find that they are all *Pterophorus delawaricus* Zeller without a doubt.

Oxyptilus (*Pterophorus*) *periscelidactylus* Fitch. Recorded from Wellington. The specimens labelled as such in the Bryant collection are *Platyptilia punctidactyla* Haw.

Platyptilia shastæ Wals. Recorded from Wellington. This was rather an extraordinary determination, as specimens bearing this label were undoubtedly *Oidæmatophorus cineraceus* Fish. A totally different insect and bearing no resemblance, either generically or specifically.

Platyptilia grandis Wals. and *Platyptilia modesta* Wals. Both recorded from Wellington. Specimens bearing these labels were nothing more or less than specimens of the common *carduidactyla*, which had apparently been separated according to their size; the latter species being very variable in this respect, as I have specimens ranging from 18 to 28 mm. in expanse.

Pterophorus (*Oidæmatophorus*) *brucci* Fern. Recorded from Shawnigan Lake by Dr. Dyar in his "Kootenai List." In his annotation he states: "Two specimens . . . in poor condition, but seeming to agree with specimens from Colorado, so named for me by Dr. C. H. Fernald."

I am rather inclined to doubt the correctness of Dr. Dyar's determination of this species on the following grounds: (1) That *brucci* Fern. and *mathewianus* Zell. have a somewhat superficial resemblance; (2) that Dr. Dyar's specimens were in poor condition and he himself was not positive that they were conspecific with his Colorado specimens of *brucei*; (3) that apparently Dr. Dyar did not have at that time specimens of *mathewianus* for comparison; (4) that specimens sent to me by Mr. Cockle, of Kaslo, as *brucei* have been determined by Dr. Lindsey as *mathewianus;* and (5) that of 250 specimens of this family recently examined from many diverse localities in the Province, not a single specimen turned up which has been even doubtfully referred to *brucei*. Taking all these facts into consideration, it is more reasonable to suppose that Dr. Dyar's specimens were in reality *mathewianus*, which was originally described

from Vancouver Island. Until undoubted specimens of *brucei* are taken in British Columbia I think it is better to eliminate this species from our B.C. Check-list.

Pterophorus (*Oidæmatophorus*) *paleaceus* Zell. Recorded from Wellington. Specimens under this name in the Bryant collection did not seem to agree with the description of that species and were submitted to Dr. Lindsey, who pronounced them to be "rather large specimens of *corvus* B. & L., not quite typical, but certainly not *paleaceus* Zell."

Pterophorus (*Oidæmatophorus*) *eupatorii* Fern. This record in our list was copied from Dyar's Catalogue (Bull. 52, U.S.N.M.), wherein he gives Vancouver Island, together with New York and California, as localities for this species. Barnes and Lindsey in their "Revision" give a detailed discussion of *eupatorii* Fern., *guttatus* Wals., and *mathewianus* Zell., three very closely allied species and which have given rise to a great deal of confusion in the past. The conclusions arrived at show that *eupatorii* is distinctly Eastern and does not occur on the Pacific slope.

In concluding this paper on the British Columbia Pterophoridæ, I would like to point out two important pieces of biological work that remain for our local entomologists to undertake, and that is the working-out of the life-histories of (1) *Platyptilia pallidactyla* Haw. and *pica* Wals., and (2) *P. carduidactyla* Riley and *percnodactyla* Wals. Careful breeding from the ova of known females, full notes on the different larval instars, together with careful comparison of the resulting imagines, will do much to prove the specific identity or otherwise of the species indicated.

The following family, with its one North American species, is included here as it is so very closely allied to the Pterophoridæ.

FAMILY ALUCITIDAE LINN.

Genus ALUCITA Linn.

Alucita Linnæus, Syst. Nat. (Ed. X.), 1, 542, 1758.

Orneodes Latreille, Precis. Car. Ins. 148, 1796.

Characters: Ocelli present. Proboscis well developed. Labial palpi strong. Both primaries and secondaries deeply cleft into six lobes each. The under-surface of the secondaries lacks the black scales which occur in the Pterophoridæ, and the legs are of normal length.

1. Alucita montana Cockerell, Ent. Mo. Mag., XXV., 213, 1889.

Orneodes hexadactyla Fernald (not Linn.), List. Lep. No. Amer., 88, 1891.

Primaries greyish-tawny, crossed by a wide dark-brown median band margined narrowly with white, which forks on the first two lobes; a subterminal band, narrower on the first two lobes, is also margined with white. Secondaries checkered with dark brown, tawny, and white.

This species is the *Orneodoes hexadactyla* of our local lists, a European species with which our North American species has generally been considered conspecific, but according to Barnes and Lindsey *hexadactyla* is much lighter and more ochreous in general appearance and entirely lacks pure white scales.

Montana has a wide distribution in North America, occurring from Vancouver Island to Ontario and from New York to California.

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VICTORIA, B.C.
Printed by William H. Cullin, Printer to the King's Most Excellent Majesty.
1922.

THIRD ANNUAL REPORT

OF THE

DEPARTMENT OF INDUSTRIES

OF THE

PROVINCE OF BRITISH COLUMBIA

FOR THE

YEAR ENDING DECEMBER 31ST

1921

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1922.

To His Honour WALTER CAMERON NICHOL,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

The Third Annual Report of the Department of Industries of this Province is herewith respectfully submitted.

JOHN OLIVER,

Premier.

Premier's Office,

February 4th, 1922.

DEPARTMENT OF INDUSTRIES,
VICTORIA, B.C., February 4th, 1922.

The Honourable John Oliver,
Minister of Industries, Victoria, B.C.

DEAR SIR,—In pursuance of section 9 of the "Department of Industries Act," I enclose herewith Annual Report.

Yours truly,

D. B. MARTYN,
Industrial Commissioner.

Report of the Department of Industries.

To the Lieutenant-Governor in Council,
Victoria, B.C.

SIR,—In accordance with the "Department of Industries Act," I have the honour to submit the following report. It contains:—

(1.) General Review.
(2.) New Industrial Development during the Year 1921.
  (*a.*) Development in Copper Industry.
  (*b.*) Automobile Tire and Tube Factory.
  (*c.*) British Columbia Magnesite.
  (*d.*) Abrasive Papers.
  (*e.*) Starch and Potato-flour.
  (*f.*) Specialty Work in Wood-working Plants.
(3.) Industries possible of Immediate Development in British Columbia.
  (*a.*) Iron and Steel.
  (*b.*) Manufacture of Glass Bottles.
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  (*e.*) Copra Oil-crushing Plant.
  (*f.*) Manufacture of Industrial Alchohol from Wood-waste and Sulphite Liquor from Pulp-mills.
(4.) Commercial Possibilities of Shark-fishing.
(5.) Complete List of Industries assisted financially by the Department of Industries.
(6.) Receipts and Disbursements from the Development Fund.
(7.) Loans repaid in Full.
(8.) Directory of British Columbia Products.

(1.) GENERAL REVIEW.

Applications for loans exceeding 1,000 in number were made to the Advisory Council to the Department of Industries to the end of 1921. Loans to seventy-six industries were recommended. Of this number, ten were not in a position to comply with the conditions laid down by the Advisory Council, and have consequently been unable to take advantage of the assistance recommended. Six enterprises assisted by the Department of Industries have repaid the amount of their advance in full and the Department is now interested in sixty industries.

During 1921 the total sales of these industries amounted to $1,560,584; number of employees numbered approximately 800 to 900 persons. This shows a decrease of 20 per cent. from the previous year. Very few industries operated at a profit during the year. The industries assisted by the Department were in arrears at the end of 1921 as follows:—

Principal	$73,498 37
Interest	22,100 57
Total	$95,598 94

The Advisory Council for the year 1921 was composed of Major Donald B. Martyn, Deputy Minister of Industries, Chairman; Major R. J. Burde, M.C., M.L.A., Port Alberni; F. G. Dawson, Prince Rupert; Joshua Kingham, Victoria; James H. McVety, Vancouver; J. E. W. Thompson, Vancouver; Nichol Thompson, Vancouver.

During the year the Advisory Council to the Department of Industries held two meetings to consider the work and applications submitted to the Industrial Board. In view of the general industrial depression the Board curtailed the granting of financial assistance to industries, the opinion being that the time was not opportune to establish new enterprises when assisted ones were experiencing difficulty in obtaining orders, and at the second meeting of the Advisory Council the granting of further loans was suspended, except to industries in which the Department was already interested or those previously under advisement by the Board.

In the month of August the Advisory Council carefully reviewed the various enterprises assisted, and was of the opinion that in many cases previous recommendations as to the time of repayment of principal and interest on various loans came at too soon a period after the launching of the enterprise to admit of proper development of the industry. These repayments were made additionally difficult on account of the present industrial depression, and the Advisory Council recommended to the Minister of Industries that he grant extensions of time in respect to the repayment of principal and interest in all undertakings where the persons connected with the business were showing a determined effort to fairly develop their enterprise without seriously impairing the security held by the Department.

During 1921 the basic industries—lumbering, mining, fishing, and pulp and paper—have experienced a period of depression never before so generally known in the Province. The low mark of activity was reached in August. Since that time a steady improvement has taken place. Recovery of business conditions no doubt will be very gradual, but the present favourable upward tendency of the shingle and lumbering industries is creating a favourable reaction in other lines. Lumbering being the chief industry of the Province, continued orders will make for a general improvement.

The large pack carried by the canneries in British Columbia made it impossible for the packers to operate extensively during the year 1921. The fishing industry was consequently hard hit, but in this respect there is reason for more optimism for future prospects, in that towards the end of 1921 a great proportion of the surplus fish-pack had been disposed of and the outlook for 1922 in the fishing industry promises much more activity than in the past year.

The growing feeling of optimism, while possibly based to some extent on a desire for better conditions, is founded on a general improvement in the fishing, mining, lumbering, pulp and paper, and other industries of the Province. This improvement is not as yet sufficiently pronounced to affect weak and struggling industries, but the improvement is steadily taking place and should be sufficient towards the middle of the coming year to produce much better conditions.

In spite of general depression, the year 1921 was marked by a distinct enlargement of the industrial horizon of British Columbia that augurs well for the future, and many new enterprises for the manufacture of articles and materials not previously made in British Columbia were inaugurated last year. Some of them, being basic industries, admit of further development in allied enterprises.

(2.) NEW INDUSTRIAL DEVELOPMENT DURING 1921.

(*a.*) DEVELOPMENT IN THE COPPER INDUSTRY.

The outstanding development of the year has been the installing of a copper-rod mill at Trail by the Consolidated Mining & Smelting Company of Canada, Limited. For many years the copper production of British Columbia has ranged high in the total of the Dominion, but no effort to further manufacture copper products has been made in British Columbia until the present installation at Trail. The products of British Columbia in reference to copper have in the past consisted of blister-copper from Anyox, copper concentrates from Britannia, and blister and refined copper from Trail.

The construction of the copper-rod mill to further manufacture the refined copper was started by the Consolidated Mining & Smelting Company of Canada, Limited, in 1920 and completed in July of this year. The main building is a substantial structure of steel and concrete, built and equipped at a cost of $250,000. The mill is of the Hoagland type and set according to the usual practice, with roughing-rolls near the bar-heating furnace and intermediate and fine rolls in a straight line. On either side of the rolling-mill the concrete floor slopes into two pits to facilitate the handling of the wire.

The copper ingots are cast to the required size in the old plant and fed into the rear end of an oil-fired bar-heating furnace by an electrically operated feeder. The heated bar is withdrawn from the furnace and transferred to the roughing-rolls, where it receives the requisite number of passes to reduce it to the size of the finished rod required. The intermediate and finishing rolls reduce the product to rods varying from ⅝ to ¼ inch, in steps of $^1/_{16}$ inch. In addition to this, the company has finishing-rolls for figure 8 rods of $^5/_{16}$ and $^7/_{16}$ inch. Up to the present the mill is not equipped for the production of flats or squares, nor copper plate. These will no doubt be the logical development of the future, together with wire-drawing equipment.

The machinery itself comprises the roughing-rolls, intermediate and finishing rolls, bar-heating furnace, coiler, roll-lathe, and scrap-cutter, together with the auxiliary plant necessary to conduct the operations and handle the product.

A plant of this nature will add an employment of from twenty to thirty men to the pay-roll of this company and provide for a hitherto untouched market in copper products in British Columbia. The ultimate results should be almost as far-reaching in the copper industries as the establishing of a steel-rolling mill would be in the steel industry.

By providing copper rods of the various specifications above the wire and nail works in the Province of British Columbia could at any time commence the further drawing-out of these rods to manufacture copper wire for local or export use. The further development in this line should produce immediate results, as British Columbia possesses the necessary equipment to manufacture the wire. The addition of equipment for rolling copper plates, flats, squares, etc., would make it possible for companies manufacturing electrical equipment in British Columbia to compete and sell their products in the world markets. It is a comparatively easy and inexpensive matter for present electric firms in British Columbia to put in the necessary insulating equipment for the handling of wire in the manufacture of electrical appliances.

The commendable enterprise and confidence in the future shown by the Consolidated Mining & Smelting Company of Canada, Limited, in initiating this new line of work should be a source of inspiration to other manufacturers in British Columbia to grasp the importance of this local source of supply that will enable them to go far afield with British Columbia electrical and copper products, and branch out with further comparatively inexpensive equipment to further complete and manufacture this available natural resource.

(*b.*) Automobile Tire and Tube Factory.

This industry, while not involving the manufacture of the natural resources of British Columbia, supplies a big local demand for materials purchased outside of the Province and in many cases outside of Canada. The Gregory Tire & Rubber Company, Limited, started building operations in 1920 at Port Coquitlam and commenced operations in March of 1921. The company is capitalized at $1,500,000 and has expended up to the present an amount in excess of $500,000 on the first unit of the plant. The company has an industrial site of 11 acres near the Canadian Pacific Railway Depot at Port Coquitlam, and has erected a three-story, solid ferro-concrete building, 180 by 70 feet. This building has been fitted with new and up-to-date machinery procured from the largest rubber centres in the world.

No industry of this nature existed heretofore in Western Canada, and the management of this plant was fortunate in securing the services of experts from other plants in the United States who at that time were experiencing the depression following the boom. It was necessary for these people to train and develop an organization in British Columbia, and so they commenced operations with an output of ten tires per day. This they have gradually increased until at the present time the company produces an average of 125 tires and 200 tubes daily. The company anticipates that by the middle of 1922 it will more than double its output. This plant gives employment to 100 workmen, with a monthly pay-roll in excess of $10,000.

The Department of Industries, in checking over the production of this plant, has in every case received a very favourable commendation on the tire turned out. They are made entirely by hand and each contains an extra ply of fabric. Nothing but the highest grades of raw materials are employed and the best selected Egyptian fabrics used in the manufacture of Gregory tires.

During the latter part of 1921 the company started working on cord tires and has turned out an initial lot of 100. These cord tires have also shown satisfactory results.

The prospects for the future of this company are exceedingly bright. It is the only tire and rubber company west of the Great Lakes, and it is claimed that in that area an amount of over $20,000,000 is expended in tires and tubes annually.

The establishment of this factory in British Columbia has been based on the fact that the raw materials going into the manufacture of tires to a great extent enter Canada and the United States at western ports, and heretofore went East as raw material and returned as manufactured goods. The Gregory people hope by eliminating the double haul to reach a market as far East as any of their competitors.

There are many industries of a like nature that could be started successfully in British Columbia. The future of this company should be reasonably certain, in that lower power rates

are obtained for the operation of the factory than in most cities of Canada, also climatic conditions make for greater labour efficiency of almost 20 per cent., as most of the operations in tire-manufacture are done by hand, and the equitable climate allows the maximum amount of labour efficiency being obtained from employees, both winter and summer.

The product of this plant has been proven by practical tests to be up to the standard, and it is in the interest of British Columbia and Western Canada to patronize and use this tire and so ensure the success in British Columbia of a company that had sufficient energy and resource behind it to start an enterprise of this nature at a time when business generally was experiencing difficulties.

(*c.*) DEVELOPMENT OF BRITISH COLUMBIA MAGNESITE.

It is claimed that the only deposits of hydromagnesite in the world possessing commercial possibilities exist in British Columbia, and the year 1921 witnessed the first developments in the treatment of this material to produce commercial magnesite. The main deposits of this material are in Cariboo District, along the Pacific Great Eastern Railway, also in Atlin, and for a number of years Mr. Nichol Thompson and Mr. Carew-Gibson, prominent in the mining industry of the Province, have endeavoured to have these deposits opened up and developed. Working samples of the material were sent to the Old Country and other places for treatment, but further development was not carried on owing to the difficulty of burning the material in a commercial manner; hydromagnesite, being in such a finely divided state, blows away when disturbed in the ordinary calcination.

The world's supply of magnesite is mainly from Greece and Austria-Hungary, the large and long-developed deposits of these countries having supplied the world until recent years, for low ocean freights made it possible to ship even crude material as far as North America and Australia. In addition to the European deposits—those of Greece, Austria-Hungary (now mainly Czechoslovakia), and also in Italy, Turkey, Spain, and Russia—other deposits occur near Salem in Madras, Manchuria, New Caledonia, Australia, and South Africa. Deposits in Quebec furnish about 35,000 tons a year—52,688 in 1917—and in recent years there has been greatly increased production in the United States, mainly by California and Washington. Formerly the equivalent of 300,000 short tons of crude European magnesite was shipped annually to the United States. In 1918 only about 40,000 tons of foreign magnesite was imported. Production in the United States, which amounted to about 9,000 tons eight or nine years ago, increased to over 280,000 tons.

At these places the material occurs in rock and earthy formations and is calcined in long rotating cylindrical calcining-furnaces centrally fired with gas or powdered coal. When the material is calcined, in addition to the elimination of the water of crystallization, it is changed chemically by the elimination of the carbon-dioxide gas (CO_2), leaving MgO varying in purity according to the original ore.

If it is desired to produce what is known in the trade as "caustic-burned magnesia," calcination is stopped at a temperature of 800° C. If it is desired to produce what is known as "dead-burned magnesite," the calcination is continued for some time and the heat raised to between 1,500° and 1,600° C., the product being the stable or unchanging form of crystalline magnesia, or "sintered magnesite." This is the form in which it has most commercial possibilities, and in this form is used as a refractory material for the manufacture of magnesite bricks for the lining of steel and electric furnaces; for the making of tile; for the manufacture of artificial stone; for sorrel cement; for tooth-paste and face-powder; or magnesium chloride; for metallic magnesium, an adulterant in the rubber industry; for whitening in paper, pulp, and wool manufacture; and as a paint. It is also used in the preparation of magnesium salts. There is a large and growing market for this material in Canada and the States in the manufacture of flooring and the exterior stucco finish on houses.

Hydromagnesite occurs in an extremely fine powder resembling talcum powder when dried. An average analysis of the British Columbia material shows:—

	Per Cent.
Clay materials, impurities	3
Iron	Trace.
Lime	„
Carbon oxide	30
Magnesia	35
Water	32

When treated in the usual form, as stated before, the material in calcination blows away in fine powder. Another feature of the calcining of this material is that the material turns almost black when partially calcined. This is due to some extent to a small amount of organic matter and serves as an indication to the operators as to the completeness of calcination. The colour of the finished material obtained from hydromagnesite is pure white. This is a decided advantage over the dull grey-coloured material produced from United States calcined rock magnesite.

Early in the year 1921 B. D. White, of the Pacific Roofing Company, became interested in the possibilities of calcining this raw material in the Province, and purchased the claim known as the "White Empress" in Cariboo Mining Division, near Tatton Station, on the Pacific Great Eastern Railway. He engaged the services of Charles E. Oliver, chemical engineer, to design and build a furnace capable of treating this material without the constant loss by present methods. After working for several months a successful experimental furnace was constructed on Granville Island, Vancouver, and from it one of commercial size, which was really a new design of the Godfrey type. It consists of a single annular tunnel with a movable floor. The dimensions of this tunnel are: Inside walls, 19½ feet; outside, 32½ feet; the width of the movable floor is 6 feet.

The hydromagnesite is fed in by a special feed on to this floor and distributed evenly over the area to a depth of not more than ½ inch. This floor is slowly rotating, making a complete revolution in forty-five minutes; both feed and discharge are automatic and continuous and the calcination is complete in one revolution of the floor.

The calcining area is 490 square feet and calcination is effected almost entirely by radiation of heat from the walls and roof of the tunnel. The tunnel is heated from two furnaces (Fuel Conservation Company patent) burning hogged fuel from the lumber-mills. These furnaces are spaced about one-third the outside circumference of the tunnel. A temperature of 1,600° C. is obtained and the material used furnishes very cheap fuel for operation.

The capacity of the calciner is 15 tons of raw material per twenty-four hours, yielding 5 tons of finished product, and the burning is carried on in such a manner that there is not more than 5 per cent. further ignition loss.

The furnace produces material of absolute uniform calcination, and after air-separation the finished product runs constantly under the 5 per cent. loss. By regulation of the feed it is claimed that they can produce material with less than 1 per cent. ignition loss. The operation of this furnace proved very successful and produced a finished product more finely divided than that on the market.

It is claimed by the inventor of the furnace that it is so designed that carbon dioxide (CO_2) can be recovered from the flue-gases of greater purity than from present existing types. He has plans under way by which the company can refine the present raw material to produce chemically pure magnesium carbonate and calcined oxide.

The deposit of the White Empress Mine, which is being worked by the Cariboo Mining Company, is estimated to contain 50,000 tons of pure hydromagnesite. In addition to this, there is a large tonnage carrying a percentage of lime and other impurities. This company is being financed and developed by the Pacific Roofing Company, Limited, of Vancouver. It has the special features of the furnace and process protected by patents and is now equipped to produce and market 5 tons of calcined magnesite per day.

Magnesium cement is from three to five times stronger than Portland cement and considerably lighter. It does not expand or contract when set; it is absolutely fire-proof. It is the best-known non-conductor of heat or cold and when made into wall-board is a fairly sound-proof material. When used for exterior stucco-work it sets like rock and is water-proof and frost-proof. It is used for flooring and covering on the decks of most vessels, also for public buildings, bath-rooms, and kitchens. Handled by an expert, it makes a magnificent imitation marble that can rarely be detected from the real article. It has been used for plastic work in ornamenting public buildings, theatres, etc., in Canada and the United States for some time.

(*d.*) Abrasive Papers.

The fact that Canada imports annually $500,000 worth of sandpaper induced J. L. Near, of Victoria, to investigate the possibilities of manufacturing this product in British Columbia. He started in a small way, manufacturing experimental batches of sandpaper in his own home. At first the abrasive material which he used was broken glass bottles, which he had crushed and sifted to the various sizes. The graded grains of glass were then taken and applied to the

sandpaper by hand and a fairly successful material turned out. There was much to learn in the experimental stages of this industry.

The Department of Industries became interested in the possibilities of this industry, and the Government Mineralogist gave assistance in examining various kinds of quartz and other abrasive materials.

A syndicate in Victoria expended an amount of $9,000 in further experimental work to determine by practical experiment the grades of paper best suited for the various flint, sand, and garnet paper, the quality of the glue required, and the cutting quality of the various materials. These requirements were all finally determined to the satisfaction of Mr. Near, and he succeeded in turning out a sandpaper that would stand up to any on the market; also a garnet-paper that the mills thoroughly tested out on their drum-sanders and found it had an average wearing quality with any on the market.

A company was then organized, known as the Western Abrasive Paper Company, Limited, and in 1921 commenced the installation of the present plant at 913 Mason Street, Victoria. J. L. Near is managing-director of this company, which has installed an up-to-date sandpaper plant at a cost of $25,000. The manufacture of the sandpaper consists of three operations and the plant accordingly is arranged in three departments. The first department consists of the crushing and grading of the abrasive materials, the second department the actual making and drying of the sandpaper, and the third department the cutting-up and packing of the materials.

It was found, on preliminary investigation of this industry, that there were no machinery-manufacturers in North America specializing in the making of sandpaper machinery and equipment. Each plant in this industry has been specially designed, and on this account it was difficult to get this industry under way, in that they had to embody the ideas in their machines that were worked out by practical experiment.

With the exception of the big manganese crushing-rolls, all other machines used in this plant were made in Victoria from designs prepared by Mr. Near.

The abrasive material used for sandpaper is a very hard crystalline quartz obtained from the Prince Rupert District, and when tested out has proven to be of the hardest quality. The company has a lease on eleven garnet claims at the mouth of the Stikine River. The company in the summer has a number of men working these claims, and the material is taken out and shipped to Victoria, where it is crushed and graded to the various sizes required.

The making-machine prints, glues, and sands the paper at a rate of 100 lineal feet per minute. The widest paper used is 40 inches. As the paper leaves the machine it is carried up an inclined plane on rods and a festoon is formed which moves slowly forward. This process is continued until the drying-rack is filled with closely festooned paper, so arranged that none of the abrasive surface touches on anything. The making-machine moves back and forward in the plant, filling the various racks in the drying-room.

After the paper is thoroughly dried it is rerolled and taken to a winding-machine in the packing department, where it is split and cut up into sheets the required width and size. The splitting and cutting-up is done by a machine specially designed by the manager. The paper used in the industry is a heavy-touch kraft paper, made at Ocean Falls.

The mills of British Columbia and the building trade annually use a large quantity of sandpaper, approximately $75,000 worth. This company has just started to break in on the market and its product has been carefully tested by an initial outlay of over $9,000 to build it up to the best grades in existence. The users of sand and garnet paper can confidently rely on the material turned out from this plant as being the equal of any on the market.

In addition to the British Columbia requirements, this company is looking forward to export and Eastern Canada markets.

(*c.*) STARCH AND POTATO-FLOUR.

A new industry established in British Columbia in 1921 of considerable interest to the farmers of the Fraser Valley is the Dominion Starch & Dextrine Company, Limited, with a plant on the water-front at New Westminster. This company manufactures starch and potato-flour.

For many years potato-flour has been in use in Europe and is fast becoming a staple food in Canada. The chief producer of this material in the past has been Germany. During the war several plants commenced operations in the United States and are now successfully supplying considerable of the requirements of that country.

During the year 1914 Canada harvested 90,000,000 bushels of potatoes, and in spite of the fact that none of this output was manufactured into starch or potato-flour, 10,000,000 lb. of starch and starch products was imported. That fact, together with local conditions in British Columbia that make for a big acreage yield of potatoes, pointed out to various financial men in Vancouver and New Westminster the possibility of this industry in the Fraser Valley. The raw material used is culled potatoes, which enables the farmers to dispose of this hitherto waste product at a fair rate. At the commencement this company paid an amount of $12 per ton for culled potatoes. In this way the grower is able to obtain a fair price and thereby dispose of the higher grades at a more reasonable figure. The operations of this industry would tend to stabilize the growing of potatoes in the Fraser Valley and make it a little less of a gamble than it is at the present time.

The process employed in this plant consists of first putting the potatoes through a thorough cleansing process, and in the case of those required for flour they are taken to a peeler and all skin removed. From the peeler the potatoes go to the steam-cooker and from there to a mashing-machine, which feeds them to the flaking-machine. This operation requires careful attention, as too much heat or improper adjustment of the rollers will produce an inferior product. The potatoes are discharged from the rollers in thin white flakes, dry and ready to be ground, and bolted through silk cloth, so the finished product is similar in consistency and fineness to the best wheat-flour.

The manufacture of starch is an entire cold process, except the drying. After the potatoes are washed they are put through a disintegrating-machine; then again washed through revolving screens until free from pulp and impurities, and graded by flotation through long tanks. After the starch has settled out the water is drained out and the starch put through a centrifugal or filter press, where all the surplus water is removed before going to the dryer. The starch is now snow white, partly powder, partly lumps. It is therefore necessary to powder it and put it through a sifting-machine before it is ready for the market. For special purposes it is pressed in blocks and broken up and sold as lump starch.

From this starch, by a roasting process, dextrine is made, of which Canada imports between 4,000,000 and 5,000,000 lb. per year. Dextrine is used by the textile-manufacturers as a dressing and by calico-printers as a vehicle for colours, also used in the manufacture of gum-paste, sizing, paper and paper boxes, wall-paper, etc.

At the present time one complete unit is in operation with a capacity of 15 tons of potatoes per day. The company has space available for five additional units and will give employment to ten persons per unit.

The raw material for this industry is grown extensively in British Columbia, while all the machinery installed by the company was manufactured in New Westminster.

The brand under which the product is marketed is Stardex Brand, labelled "Snow White Prepared Starch for Culinary Use" and "Snow White Potato Flour."

(*f.*) Specialty Work in Wood-working Plants.

In closing this section of my report of the new and non-competitive industries established during the year of 1921, I wish to mention a kind of development that is taking place in some of the wood-working plants of the Province. British Columbia had many trying times in respect to the wood-working business. It is claimed by some that there are more failures in this line than other industries and that in some respects it is overdone. Others claim that the fault is one of lack of organization; the market requires at certain seasons a large pay-roll and at others the plants are practically idle for want of orders. To offset this it is suggested that these plants manufacture some special article required by the public all the year round. The difficulty has been to determine something of this nature that can be manufactured at a profit.

The enterprise of the T. H. Waters Company, Limited, of Nelson, along this line is worthy of commendation. This company, at an outlay of approximately $15,000, has commenced to manufacture spring clothes-pins from British Columbia birch and alder. It was necessary for the company to build three special machines and remodel others to engage in this line; one special machine being the automatic wire-spring-winding machine, which cost the company $3,500. By this side-line the company expects to give constant employment to ten people, and by making use of local wood heretofore not worked up expects to place its wood-working plant on a stable all-year-round paying basis.

(3.) INDUSTRIES POSSIBLE OF IMMEDIATE DEVELOPMENT IN BRITISH COLUMBIA.

The immediate future should further fill out the many present opportunities that exist for further industrial enterprises. The lack of all-year-round industries in British Columbia is severely felt, and if one were to mention what could be started here the list would be a very long one. However, based on strong local market demands and the possibilities of development for the Eastern Canadian and export markets, there are several industries which warrant the immediate attention of capital.

(*a.*) IRON AND STEEL.

First among these would be the development of the iron and steel industry. So much has been written on this industry that beyond stating the opportunities for it in British Columbia, it is not the intention of this report to deal further with the matter at the present time. There are several interests working at present towards establishing it, and the future will see something definite accomplished.

There are several minor industries, however, that require less capital and have proportionate possibilities that would be of considerable benefit to the Province and to other enterprises, industries which by the judicious employment of capital should yield a good return to the investor who has sufficient foresight to take advantage of them.

(*b.*) MANUFACTURE OF GLASS BOTTLES.

Chief among these I would place the manufacture of glass bottles and containers. In the past some effort has been made to start this industry and several years ago a company commenced in New Westminster. This company, however, was more interested in the sale of stock than in the development of the industry, and the company finally went into liquidation and the plant was moved to Anacortes, Wash., where it has operated continuously for the past number of years to the benefit of that district and more particularly to the City of Seattle.

In 1916 a small attempt was made in Victoria to manufacture glass bottles and a hand-blowing plant was established on the Carey Road. This gave employment to six or eight men for a number of months and bottles were shipped to Calgary, Vancouver, and other places. Through failure to have a satisfactory supply of raw material this enterprise did not succeed. It is also claimed that it did not provide for the up-to-date requirements of the bottle trade. The materials used were cullet and sand from Mount Tolmie.

Sand.—In the past the trouble in starting this industry has been a proper local supply of raw material. The chief material required is a sand free from impurities, and at present the chief sources of this material are Belgium; China; Ottawa, Illinois; and Monterey, California. The nearest supply, at Monterey, is suitable for making a blue bottle-glass. The sand at Ottawa, Illinois, is suitable for making flint-glass and other clear bottles.

To date no satisfactory deposit of sand has been located in British Columbia. This, in some respects, has no doubt been due to the fact that prospectors and others have not realized the commercial value of sand-deposits, more particularly in that the development of these sand-deposits would not provide for any great return for the discoverer. They would, however, be of great benefit to the Province.

To overcome this local condition it has been represented by persons familiar with the industry that the same plan could be followed here as at Anacortes; that is, of bringing in the sand from Ottawa, Illinois. The cost of the sand delivered at Anacortes from Ottawa, Illinois, is $12.50 per ton to lay down the material in their factory, and a local industry could be started along these lines, importing sand from Ottawa, Illinois, and Monterey, California. After the industry is developed local sands could be tried out until satisfactory deposits are discovered.

There are also further possibilities with respect to the utilization of quartz, which occurs in British Columbia almost 100 per cent. pure silica, and which is suitable by crushing for the highest grades of bottles and products in the glass industry. Deposits of this quartz occur on Douglas Channel, Banks Island, Dorothy Mine near Fanny Bay, North Bend, Kamloops, and Armstrong District. People familiar with some of these deposits claim that this quartz can be mined, crushed, and delivered at a plant in New Westminster, Vancouver, or Victoria for about $9 a ton, and in this way an excellent local material supplied for a glass-works. Persons starting in this industry could well have this in view as a future development to reduce their costs.

Soda-ash.—This material also could be at present obtained, as at the Anacortes plant, from the United States and England. It is of particular interest to the glass industry to know that

there are extensive deposits of carbonate of soda in British Columbia near Chasm, on the Pacific Great Eastern Railway. A company has acquired these deposits and is contemplating their immediate development. These deposits are of special purity and a conservative estimate of the visible supply is 237,000 tons. This material requires to be dehydrated to obtain soda-ash. The unique nature of these deposits, occurring as they do in the pure soda, should make it possible to develop them at a lower cost per ton than present deposits in California, Egypt, and elsewhere, which require an initial separation from other impurities and salts before dehydration can be carried on.

As an offset to the handicap of sand, this local supply of soda-ash should furnish an added advantage to a company operating in British Columbia.

Limestone.—This material is obtained in any quantity locally.

Cullet (Broken Glass).—This material is introduced to make a quicker melting, but is not absolutely essential in the manufacture of bottles. Large amounts of this material are available in every settled district.

The utilization of the above-set-out materials essential for the glass-making industry produces a clear glass. The different colours are obtained by the introduction of coal, sulphur, and other materials.

Markets.—The breweries, dairy industries, fruit-canneries, and pickle industries would furnish an enormous market for glass bottles in British Columbia, and the further development of the chemical-manufacturing industry of liquid pastes and prescription wares would require a bottle-factory to be in existence in British Columbia turning out their requirements. These various industries generally start in a small way and at present are handicapped in having to order bottles in car-load lots from Eastern Canada. The present supply for Canada is controlled by the Dominion Glass Company, with factories at Montreal, Toronto, Hamilton, Winnipeg, and Redcliffe, Alberta. British Columbia requirements are chiefly supplied from Montreal and the freight on one car-load of bottles to British Columbia would approximate $500.

There is sufficient demand in British Columbia for soda-water and beer bottles to take care of the output of a one-unit plant, and it is considered advisable for persons interested in this enterprise to put in to start a unit to handle this line of business. There are various types of up-to-date glass plants, and the equipment required would consist of a regenerative furnace, 15 to 20 tons, of the Semins-Martin type, oil-fired or heated by gas from gas-producing equipment. A funace of this nature would require one annealing lehr of a size of 10 to 16 by 70 feet in length; this lehr fired in the same manner as the furnace. Two types of bottle-making machinery are the Lynch Noboy machine or the Amsler-O'Neill bottle-making machine. A furnace of the size set out above would take care of about three bottle-blowing machines. The automatic operation of the blowing of these machines requires the installation of an air-compressor and fan-cooling system. These, together with the motors, storage and mixing tanks, and machine-shop equipment, go to make up the smallest unit of a glass-bottle factory, and at the present time in British Columbia there is ample business offering to keep one unit such as the above working on brown bottles alone.

The demand for clear-glass bottles, such as milk-bottles, fruit-containers, tumblers, prescription wares, glass tops, etc., would be sufficient to keep one other unit of a like size and a 20-ton furnace operating on a clear-glass mixture.

The chief item of expense in a glass plant would be the furnace and lehr, and in this connection it is interesting to note that the Anacortes plant obtains its supply of brick for the furnace from a British Columbia plant, and by the use of local material the cost and upkeep of these two items of the factory equipment should be reasonably low.

The cost of putting in one unit of a plant of this nature has been estimated to be from $45,000 to $60,000. This does not include an outlay for site or buildings or working capital. Persons commencing a glass-making industry in British Columbia should, to ensure success, arrange for a capital of $100,000.

The Industrial Commissioner visited the plant of the Pacific Coast Glass Works in San Francisco and that at Anacortes, Washington. In checking up the possibilities of this industry it is found that there is a reasonable prospect of success for this industry with an adequate return for capital invested. Its importance to other enterprises is fairly big, in that the establishing of a glass-manufacturing plant in British Columbia would assist a large number of smaller enterprises requiring glass containers.

(*c.*) DEVELOPMENT OF CARBONATE OF SODA DEPOSITS.

The requirements of the glass industry in respect to raw material points out one anticipated local market for soda-ash. This anticipated demand is only a fractional part of the present world-wide demand for this product, listed on all trade reports as a stable article of commerce. The deposits that occur near Chasm, on the Pacific Great Eastern Railway, about 200 miles from Squamish, possess possibilities that would warrant their further development. These deposits are owned by a Vancouver syndicate, which is endeavouring to raise the necessary capital to undertake the development of them, and to this end it has formed the Lillooet Soda Company, Limited. It is not the intention of this report to in any way encourage any individual person to invest in this undertaking, but from the standpoint of the development of the natural resources of British Columbia the possibilities of this industry should warrant the people interested in it in having sufficient confidence in the enterprise to raise the moneys necessary for its development in the near future.

All the essentials for a good and new industry, as far as British Columbia is concerned, exist in these deposits, and it is hoped that the public-spirited people interested in these claims will see to it that an opportunity is given to capital to engage in this enterprise that would further widen the industrial horizon of British Columbia, and provide a natural resource that enters into the manufacture of glass and soap and is used in many other lines of industry, such as the woollen trade.

(*d.*) MANUFACTURE OF PAPER BAGS.

It is several years now since the first pulp and paper plant was established in British Columbia, and the possibilities of further enterprises of this nature engaging in this Province are well known and are at present attracting the attention of several syndicates interested in this line of development, so that there are new pulp and paper plants planned for the near future in British Columbia. These new plants will be a natural development of a proven field. There is, in addition to this, great possibilities in the further completion and manufacture of paper products in their more finished forms. It was the original intention of one of the large companies operating in British Columbia to have its different plants specialize and develop along the lines of further manufacturing the paper products in its most completed form. These plans up to the present time have not materialized, so that in British Columbia at the present time, in spite of the fact that the Province is a large producer of paper, many of the finished requirements have to be brought into the Province from Eastern Canada and elsewhere, and the Province is annually losing the benefit of a large pay-roll in the further manufacture of this line of industry.

The immediate demands of British Columbia and the Prairie Provinces indicate that the time is opportune now for the establishing of a paper-bag factory in this Province. British Columbia requires for its own use approximately six car-loads or 6,000,000 bags per month and the requirements for the Prairie Provinces would each amount to seven or eight car-loads per month. In so far as the Prairie market for paper is concerned, the establishment of an enterprise of this nature would be a great boon to the sale of British Columbia paper, in that it would provide for the shipment, to even small towns, of mixed car-loads of bags and wrapping-paper.

Various estimates of the plant necessary to turn out the requirements for Western Canada vary from $75,000 to $150,000, according to the machines installed. There are certain machines that are adjustable to the various sizes of bags, and once adjusted operate in an automatic manner. Other machines, claimed to be more efficient and economical in the use of material, are not adjustable, and the plant would require a complete installation of machines for each size of bag to be turned out.

Capital interested in the development of this enterprise would no doubt secure the co-operation of the paper-manufacturers of the Province. The question of an adequate market would be a vital one at the present time and could be overcome by the above co-operation and the development of an export market along the lines of that already opened up by the paper-mills.

The Department of Industries has an extensive file on the possibilities of this industry and would be glad to give any information required to persons interested, with a view to starting this industry in British Columbia. As a guide to the capital required, we would say that, in our opinion, approximately $125,000 would be required to engage in this business.

(*e.*) COPRA OIL-CRUSHING PLANT FOR BRITISH COLUMBIA.

The Dominion Government Commercial Agent at Sydney, Australia, suggests the possibilities of a new industry for British Columbia, and bases his conclusions on the successful development in Sydney, Australia, of the treatment of copra for the production of cocoanut-oil, stearine, oil-cake, meal, and fertilizer. The possibilities of this industry as set out in his report are as follows:—

"South Sea Island producers of copra and interested Sydney exporters of that product have frequently expressed surprise that Canadian commercial enterprise has not, up to this date, recognized the importance of establishing a plant at Vancouver to treat this valuable product, and so develop an encouraging trading connection with the South Pacific, and more especially with the group of islands under British sovereignty.

"To copra-dealers it appears an anomaly that (particularly since 1914) while a very large and increasing market has been established at San Francisco, there is no plant in Western Canada to treat copra for such valuable products as cocoanut-oil, stearine, oilcake, meal (for animal foods), and fertilizers. San Francisco supplies a considerable portion of the United States (and possibly Canadian) requirements. On expert advice it is stated that the plant necessary to crush copra is not costly; hence the liberty is now taken of commending to the consideration of the various Boards of Trade and branches of the Canadian Manufacturers' Association in British Columbia the benefit to be derived by that Province in erecting a crushing plant to treat this product on an extensive scale.

"It may be observed that cocoanut-fibre is used in making coir-rope, which probably already finds a ready market in British Columbia and other Canadian centres, and a considerable sale is made to the fishing-fleets, etc., on the Pacific and Atlantic seaboards.

"It is clear that the vessels engaged in conveying copra from the various groups in the South Pacific to San Francisco are building up a reciprocal trade in supplying canned meats, flour, biscuits, and island requirements generally, which trade is now entirely lost to Canada. The steamers of the Canadian Government Merchant Marine in the transpacific trade would find copra (being easily and quickly loaded) an attractive and remunerative cargo, and—in the case of several groups of islands—there would be little diversion from the direct (returning) trade route.

"The data in subsequent paragraphs have been obtained from reliable sources, and are submitted with the hope that the Western Canadian commercial enterprise will thoroughly investigate the position and, after doing so, recognize the trading benefits to be derived by the erection of a crushing plant in British Columbia for the treatment of copra.

"*The Cocoanut.*

"The cocoanut is the fruit of the coco-palm (*Cocos mucifera*) and is generally recognized to be the most important product of the tropics. The thick meat or endosperm of the seed is used for food, both ripe and unripe, and the milky food in the fresh nut furnishes a refreshing drink.

"*Copra, the Kernel of the Cocoanut, and its Uses.*

"Copra is the commercial name applied to the dried and broken kernel of the cocoanut after it is split and prepared for shipment. Copra is exceedingly rich in oil, averaging from 65 to 70 per cent. of its bulk. It is nearly colourless when pure and is of the consistency of butter at ordinary temperatures. After the stearine is taken away it has many physical properties similar to butter, and it is largely used in the composition of margarine. It is made up by Sydney manufacturers in very attractive form and is in much demand for cooking purposes, more particularly on account of its good keeping qualities. Large quantities of the oil extracted from copra are used in Australia for soap-making, candle-making, and for many other purposes.

"Oilcake and meal for animal food are made from the residue, and fertilizer is also made to a small extent. Copra is therefore one of those products from which there is practically no waste. The husks of the cocoanut are made into rope, called coir-rope, which is very elastic and stretches to a much greater extent than ordinary rope. As it is very light and cheap and does not rot so quickly as other ropes when kept in the water for a long time, it is in great demand. It is particularly useful in the larger sizes when used in connection with the mooring of vessels, where they are subjected to the scend of the sea, as it stretches considerably before breaking.

"Owing to its inflammable nature, due to the large percentage of oil contained, copra was seized upon by incendiaries during the war period as excellent material for their operations, and so serious were their operations that the authorities prohibited its storage on wharves. These restrictions have lately been withdrawn and the storage of copra is permitted on wharves under certain conditions.

"*Australian Exports of Cocoanut-oil and Copra.*

"So far as Australia is concerned, the entire copra trade with the islands of the South Seas passes through Sydney, and, conversely, the islands also obtain their principal supplies from Sydney. Since the termination of the war additional supplies of copra have been received in Sydney from the mandated territories; in fact, such large quantities (the result of heavy accumulations) were received as to seriously affect the price for the time being.

"Excluding Papua, the former German territory in New Guinea, and the mandated islands of the Bismarck Archipelago, cocoanut-trees are not cultivated in Australia proper; hence any trade of the Commonwealth in cocoanut-oil and copra must be attributed to the oil-crushing plants in Sydney and transhipments of the raw products to the various copra-using centres abroad. There is in Sydney an extensive soap-making industry, with headquarters in Liverpool and with subsidiary companies in Canada, which crushes the oil from copra for distribution to allied works in overseas countries. This oil enters largely into the manufacture of certain classes of soap. The company has a number of important plantations in the South Pacific.

"The appended return indicates the exports of cocoanut-oil and copra from Sydney for the fiscal year ended June 30th, 1920, from which it will be observed that Canada is importing some oil:—

"*Exports of Cocoanut-oil.*

"From Sydney to—	Tons.	Value.
United Kingdom	1,553	£105,223
Canada	150	14,138
New Zealand	327	23,952
Pacific Islands, Fiji	19	1,793
Papua	...	2
South African Union	12	1,251
Belgium	329	31,738
United States of America	100	7,089
	2,490	£185,196

"*Exports of Copra.*

United Kingdom	11,512	£470,999
France	101	4,020
United States of America	1,824	71,895
	13,427	£546,914

"The shipments of copra shown above as being shipped to the United States are merely a small proportion of the total amount shipped to that destination. Many vessels coming to Australia laden with timber, which used to take coal to South American ports as a return cargo, no longer do so, as this trade has almost entirely vanished as compared with what it was some years ago, vessels now proceeding to the islands back-loading with copra. What the quantity is it is impossible to say, but it is certainly a large one. Most of this trade has grown up since pre-war times and manufacturers in the United States have realized the potentialities of the trade.

"*Prices of Copra during the Last Thirty-five Years.*

"Few other commodities have had such ups and downs in price as copra. From the year 1885, when the records start, right up to 1905, it fluctuated between £7 ($34.07) and £15 ($73) per long ton, but this was the period when the great value of copra was not properly known and its contents used for soap-making only, the balance being turned into oilcake for animal feed. Just about that time it came into use in connection with the manufacture of margarine, and in 1907 the price reached £22 15s. ($110.72). Other copra-producers then began to show

appreciation of its value and rushed quantities to markets, which collapsed to £13 5s. ($64.48) in 1908. In 1913 it reached £27 12s. ($134.32), and when war broke out tumbled to £14 ($68.13). Containing as it did valuable glycerine contents, the outlook suddenly grew brighter, and in 1917 the market price was £27 ($131.40). With the cessation of hostilities the demand for fats in European countries was so great that copra soared to £47 ($228.73) per ton, being the highest price ever reached in Australia. As previously mentioned, at this period large quantities of copra which had accumulated in the mandated territories were suddenly thrown on the market, with the inevitable result that the price dropped to £13 ($63.26). It gradually recovered to a more normal price, and is now in the region of £19 ($92.46) per long ton.

"*Freights on Copra.*

"Freights for copra to New York and San Francisco have recently been reduced. The rate to New York has been lowered to £4 15s. from £6, and to San Francisco from £3 10s. to £3.

"*Experimental Tropical Garden for Cocoanuts.*

"While cocoanuts are constantly being planted in various groups of islands in the South Pacific, yet in the former German possessions in the Bismarck Archipelago (embracing a portion of New Guinea)—now administered under a mandate by the Commonwealth Government—was the first experimental garden, established at Rabaul, where practical tropical agriculture and horticulture was carried on by experts to the great benefit of planters and colonists generally. This experimental garden (which is also a garden of pleasure and contains many ornamental trees and shrubs) was originally mostly devoted to the different species of rubber, having been established at the time of the rubber boom. Since then not so much attention has been paid to the rubber-trees and more to the cocoanut-trees.

"When these territories were captured the German scientists were displaced and Australian experts installed in their stead, the work since the war period having been carried on with gratifying success.

"*Captured Plantations to be sold.*

"The Expropriation Board appointed to deal with the holdings captured in the ex-German territories has decided to sell the plantations, recognizing that it is better for the separate holdings to be in the hands of individuals rather than try to run them on the communal or departmental plan."

(*f.*) MANUFACTURE OF INDUSTRIAL ALCOHOL.

The Advisory Council for Scientific and Industrial Research at Ottawa has pointed out the possibilities of the utilization of the wood-waste of British Columbia in the manufacture of industrial alcohol. At the present time it is represented that the International Alcohol Corporation of New York operates a successful industry, treating wood-waste at Fullerton, Louisiana, and Georgetown, S.C.

During the war a departmental committee of the Imperial Government considered this question and brought out a very extensive report, published in the London *Times* of July 1st, 1919. At that time it was recognized that the future requirements of the world would very soon make it essential to have an alternative fuel to gasolene, and the possibilities of turning out a power-alcohol were thoroughly considered and gone into.

The opportunity for this industry in British Columbia is set out by the Advisory Council for Scientific and Industrial Research, as follows:—

"A number of modern lines of industries are dependent on a cheap form of alcohol known as industrial alcohol. Industrial alcohol is very largely ethyl or 'grain' alcohol mixed with some substance which will render it unpotable, but not unfit for the use to which it may be put industrially. The substances the addition of which renders ethyl alcohol unpotable, and which are therefore called 'denaturants,' are very numerous, but the uses to which 'denatured' alcohol may be put limit the number to a few, such as wood-alcohol (methyl alcohol), benzol, pyridine bases, bone-oil, etc., and of these wood-alcohol is the most common denaturant, giving with ethyl alcohol a mixture known as 'methylated spirits,' consisting approximately of 10 parts of ethyl alcohol of 95-per-cent. strength to every one part of methyl alcohol.

"This denatured alcohol is very extensively used abroad as a chemical agent, a precipitant, a solvent, a cleaner, in many industrial processes, especially in the chemical industries, and it

is also used as a motor-fuel to replace gasolene and for illumination purposes. The importance of it in these lines is seen in the fact that the quantity of industrial alcohol used in Germany is very great, amounting in the year ending August 31st, 1904, to 101,823,470 gallons, while the consumption of denatured alcohol in the United States for 1913 was 16,963,353 proof gallons and for 1918 90,644,722 proof gallons. This latter limit was reached by greatly increasing annual consumption since the first of January, 1907, when the manufacture and sale in the United States of denatured alcohol was freed from the restrictions which up to that date had been imposed on it. The consumption before 1907 had been about 500,000 gallons annually.

"Cheap alcohol is a necessity for a large number of lines of industry and the extent of the consumption of it in a country is an index of the development of its industries, especially the chemical. The large amounts annually used in Germany and the United States are therefore significant of the value of cheap alcohol.

"In Canada the consumption is a meagre one. It was only 252,000 proof gallons in 1917. If it had been in proportion to the population as compared with the United States, the amount would have been in the neighbourhood of 5,000,000 proof gallons, or about twenty times as much as it was.

"One of the reasons for this very limited consumption is the cost, a very important contributory factor, to which is added the conditions under which the denaturation is carried out by the Department of Inland Revenue. All the alcohol so used has to be shipped to Ottawa from the distillery where it is produced, and after it is denatured it is shipped to customers. The charges for transportation to and from Ottawa do not matter greatly if the distances involved are small, but when these reach 500 miles and may in some cases exceed 2,000 the charges are a serious tax and tend to discourage the use in industry of denatured alcohol.

"Another factor is the present high price of alcohol due to the bonding system, which requires that alcohol shall be kept in bonded warehouses for two years before being sold to the trade. Much of the present supply in Canada has been in bond for considerably more than two years. This involves interest on the buildings and plants used for this purpose and for that time on the original cost of the alcohol so stored. This can to a certain extent be justified for alcohol that is to be used to produce beverages therefrom, for during this storage there is a gradual alteration or disappearance of certain of the accompanying compounds which are more toxic and harmful than pure alcohol is. For industrial purposes, however, freshly distilled alcohol is as effective and serviceable as alcohol which has been allowed to age, and consequently it would be considerably cheaper than the latter.

"The current price of pure ethyl alcohol in Canada is due to the restrictions referred to—to the high cost during the last three years of corn and other raw material used to produce it. The wholesale price of alcohol of 95-per-cent. strength at the time of this writing is $7.43 per gallon, which includes the excise duty of $3.96. The distiller then receives about $3.47 per gallon, while the wholesale price of ethyl alcohol of 95-per-cent. strength in the United States is from 50 to 55 cents per wine gallon. Denatured alcohol made from the present supply of ethyl alcohol in Canada would cost at least six or seven times what it does now in the United States, but the situation is an artificial one and therefore likely to be only temporary.

"Even the wholesale price of American alcohol is higher than it was in 1914 because of the higher price of corn, from which it is made, and so long as the supply of food for the world is scarce or not abundant, as is the case to-day, the price of alcohol will remain approximately as at present. If, however, other raw materials not foodstuffs and not used for any object could be employed in the production of alcohol, the price might eventually be considerably reduced. The waste molasses of the sugar-refineries was and is employed for this purpose, but the amount available in Canada is not very large. There is one waste material which in Canada and the United States has not been so used—namely, the sulphite liquor of our numerous pulp-mills. Enormous quantities of this are produced annually in Canada and it is being and has been disposed of by pouring it into the streams and rivers, poisoning all fish and other life therein. It contains ½ per cent. of fermentable sugar, from which in the liquor of the pulp-mills in Norway and Sweden more than 1,000,000 gallons of ethyl alcohol are produced annually. It has been estimated by Professor R. F. Ruttan, who has given much attention to this subject, that the sulphite liquor of the three pulp-mills on the St. Maurice River would, if utilized for this purpose, produce annually about 640,000 gallons of alcohol of 95-per-cent. strength and at a cost of under 35 cents a gallon. It has also been estimated that the sulphite liquor of all the pulp-

mills in Canada is sufficient to produce at least 5,000,000 gallons annually; that is, enough to supply the needs of Canada for the next twenty years. Perhaps the cost per gallon may be reduced when the resinous and other non-sugar constituents of these liquors, amounting to about 8 per cent. of the same, are put to some practical use, not thrown away as now. They are to a certain extent already utilized in tanning and the resinous material 'sulphite pitch' has been suggested as binder in briquetting slacked coal, and indeed it has been used to a small extent for that purpose.

"Another kind of raw material for the production of alcohol is wood-waste in all its forms, including slabs, strips, and sawdust from sawmills. The quantity of this annually destroyed or allowed to decay is enormous, especially in British Columbia, where it is estimated between 5,000 and 15,000 tons of wood are burnt daily to get rid of it. As the sawmills of Eastern Canada operate only about five months in the year, and, further, the collection of the waste is not economically feasible as yet, the utilization of this waste for making alcohol is not practicable at present, but in British Columbia the only possible difficulty is the extent of the market for alcohol. The conversion of wood-waste into alcohol is carried on elsewhere. At Georgetown, S.C., and at Fullerton, La., are plants in which the Tomlinson process for the conversion of wood-waste into alcohol is employed. It is possible that this process might be employed in the Pacific Coast Province, especially if a portion of the waste is used to make glucose, which can be mixed with hay and other fodder to make special cattle-foods.

"The use of denatured alcohol as motor-fuel to replace gasolene is not a remote possibility. The annual consumption of gasolene is increasing and the price per gallon of it is mounting as new sources of supply do not meet the increasing demand for it. It is indeed claimed that the world's supply of gasolene will be exhausted within thirty years. Whether this is so or not, it is clear that the price is going to increase, and this will necessitate the resort to other liquid fuels as serviceable or nearly so, and amongst these is denatured alcohol. The only handicap to its use is the price. If industrial alcohol could be produced cheaply it would quickly replace gasolene, for it could with slight changes in the motor-engine be as effectively used. A pound of gasolene will give on combustion about 20,200 B.T.U., and accordingly 1 gallon of gasolene should as a source of power go as far as 1.45 gallons of alcohol, but the actual efficiency of gasolene is less than this, and therefore industrial alcohol at 30 to 35 cents a gallon, a not impossible price in the near future, should successfully compete with gasolene at 50 to 55 cents per gallon, a price that will be reached and exceeded in a few years. Alcohol was produced in Germany before 1914 at a cost of 20 to 24 cents per gallon, which could not compete with gasolene at 30 cents.

"A survey of all the facts concerning gasolene and alcohol as motor-fuels makes it almost an absolute certainty that alcohol denatured for the purpose will be the motor-fuel of the near future. It can be made from materials now considered waste and yet inexhaustible, while the supply of gasolene, unless made synthetically, will become exhausted. As the supply approaches exhaustion the price will rise and alcohol will then, if cheap, take its place as fuel.

"Cheap alcohol should be provided not only for its service as motor-fuel, but also for the development of Canadian industry. With methylated spirits to-day at 70 cents per gallon in the United States and at $1.30 in Canada, the handicap on Canadian industry is apparent. The necessity of cheap alcohol has been emphasized by the various bodies interested in Canadian chemical industries, and especially by the Canadian Branch of the Society of Chemical Industry and by the Associate Chemical Committee of the Council. As a result of the representations of these and other bodies on the question of industrial alcohol, the Research Council gave prolonged and careful consideration to it and formulated recommendations to the sub-committee of the Privy Council, which are summarized as follows:—

"(1.) That the production of denatured ordinary alcohol, such as methylated spirits, be carried out at any distillery licensed to that end and under such regulations as the Minister of Customs and Inland Revenue may prescribe, and that the denatured alcohol so manufactured be sold duty-free, delivered, and transported without any restrictions to dealers, manufacturers, and other persons.

"(2.) That the manufacture of specially denatured alcohol—that is, alcohol which is to be used for the production of some chemicals, ether, chloroform, etc., and for which a special denaturant is required—be permitted under regulations prescribed by the Minister of Customs

and Inland Revenue in distilleries licensed thereto and sold duty-free to the manufacturers of such chemical preparation.

"(3.) That pure ethyl alcohol without admixture with any denaturant shall be sold duty-free for use in the manufacture of such products as require the use of such alcohol as a solvent, precipitant, or agent, under regulations to be prescribed by the Minister of Customs and Inland Revenue.

"(4.) That pure ethyl alcohol be sold duty-free, under such regulations as the Minister of Customs and Inland Revenue may prescribe, to incorporated hospitals, to universities, and to scientific and research laboratories.

"(5.) That the recovery of alcohol by distillation after it is used be allowed in the plant in which it was used, under such regulations as may be prescribed by the Minister."

In the past the chief objection to the establishment of this industry has been the Inland Revenue restrictions. At the session of Parliament held in the spring of 1920 amendments were passed that overcame this difficulty, and it is now possible to provide for the treatment of the product of a plant of this nature in British Columbia without having to ship it to Ottawa.

Since the publication of this report the Department of Industries has interested the International Alcohol Corporation in the possibilities of commencing operations in British Columbia, and it is ready to take up the development of this industry with any lumber-mill, company, or syndicate in British Columbia interested in this business.

In addition to this company, certain English and German interests have expressed a desire to co-operate with local persons with a view to establishing an enterprise of this nature. The Department of Industries has a fairly extensive file of further details in respect to the possibilities of this industry and will be pleased to furnish information on application.

(4.) COMMERCIAL POSSIBILITIES OF SHARK-FISHING.

From the standpoint of eliminating a pest preying on the commercial fisheries of the Pacific Coast, a bounty paid on the killing of sharks for their elimination would seem to be justified. The ground or mud sharks are prolific in British Columbia waters, and in addition to the large amount of edible fish consumed by them they are responsible for the destruction of fishing-gear of considerable value every year. In some sections on the Coast it is impossible to put down halibut and dogfish gear without having it torn and cut to pieces by sharks getting the bait and tearing up the equipment. At the present time bounties exist for the killing of hair-seals in certain waters, and the Fisheries Department make determined efforts from time to time to eliminate them in the Fraser River. Of late years the rapid increase in the sea-lion herds has been a constant worry to the permanent fisheries of British Columbia. It is estimated that one sea-lion consumes 60 lb. of edible fish per day, and their rookeries have, of recent years, extended down to the northern portion of Vancouver Island.

Many fishermen and those dependent on the fishing industry in British Columbia consider that the protection of British Columbia fisheries requires the establishing of an adequate bounty on the destruction of sharks, sea-lions, and hair-seals.

Apart from the desirability of killing off these destroyers in the fishing industry, there are possibilities that even at present make their destruction come within the scope of a commercial undertaking on their own account.

Those who have made a study of the utilization of aquatic products are convinced that there are commercial possibilities in the production of fish-oil, poultry-food, fertilizer, and leather from these animals, and particularly in the shark-fishing industry. Private enterprise, however, is diffident about doing the pioneering. The Commission of Conservation for Canada in a recent report says:—

"The question arises as to who is to take the matter up—the Government or the private capitalist. The latter is not likely to enter the business owing to ignorance of market conditions, and to the fact that there are many elements connected with it beyond his control."

With respect to the business of manufacturing fish-meal and fertilizer in particular, the report says the private capitalist may meet with "the objection of the fishermen to handing over their waste at a price that the manufacturer can afford to pay. Nor can he count on the sympathy of the agricultural industry towards a food-supply to which it has not been accustomed. The private enterprise would thus be confronted by the two greatest problems of the manufacture—namely, the control of his raw material and the distribution of his manufactured product."

"It is therefore the duty of this Commission," says a paper published by it, "or some other governmental authority to undertake this pioneer work, and to show, first, the fishermen and canners that it is to their advantage to dispose of this material at a nominal figure, or, preferably, on a profit-sharing basis; and, secondly, when manufactured, to demonstrate to the farmer, through experimental work on the Government experimental farms, the value of this great food reserve lying dormant in Canada, only waiting to be extracted and made use of by the Canadian farmer and returned to Canadian soil."

These remarks referring to the utilization of fish-waste apply equally to the manufacture of fish-meal and fertilizer from shark-flesh, sea-lion and hair-seal carcasses.

During the past few years considerable development has taken place in the utilization of aquatic products, notably since the shortage in leather and other products of land-animals, for which aquatic products offer good substitutes. The United States Government during the past six years has been conducting research-work in this connection. The results obtained to date indicate that there are considerable possibilities in the development of various industries to use what the sea offers and which has heretofore been neglected or wasted. The Dominion Government has also conducted some experiments, chiefly along the line of the manufacture of fish-meal from fish-waste for cattle and poultry food and in the production of fertilizer from fish-waste.

Spasmodic attempts have been made to determine the commercial possibilities of sharks, sea-lions, and hair-seals, and during the year 1919 one of the tanneries in British Columbia secured a large number of hair-seals from Russia and successfully tanned and utilized the hides in the manufacture of shoe-uppers. During the years 1917 and 1918 a glove-factory operated in Victoria, manufacturing a heavy working-glove, using sea-lion hides. These skins were obtained by Mr. Cessford, of Victoria, who on one week's trip north secured about 700 skins. These skins when tanned are similar in pliability to horsehide and make a very good glove material. Altogether this plant handled about 1,500 skins and turned a very fair product.

During the year 1919 a company called the "Veterans' Products Company" was organized to go into the shark-fishing on a commercial scale. In a pioneer company such as theirs considerable research-work had to be done in finding suitable fishing-grounds, also gear suitable for this industry, determined by practical tests, and the method of handling the catch in various conditions of weather found out. The results obtained by them should have considerable bearing upon the future development of this branch of British Columbia's sea resources. This enterprise was started as a result of the experience of two fishermen in the Gulf of Georgia in the autumn of 1918. These two men, fishing for dogfish with the ordinary dogfish-gear, caught ninety-one sharks in six days. These fishermen utilized the livers to as good advantage as those from the smaller fish. They found that it was impossible to retain many of the larger sharks through the lightness of their gear, but were convinced that with a proper outfit they could make a commercial success of it.

The method adopted by the pioneer company in this industry proved to be fairly successful. This consisted of laying a long steel cable on a mud bottom anchored at both ends. Hooks from 6 to 12 inches in length were attached to this cable by lighter steel lines at distances of 25 feet. These hooks were baited with hair-seal flesh, sea-lion, salmon, and the flesh of condemned horses and cattle. It was found that the best results were obtained by using the bait of hair-seal and sea-lion, and that, on an average, one shark to every four hooks was obtained at a lift. This gear was set out at night and morning and lifted every twelve hours.

The report of the United States Commissioner of Fisheries for 1918 says:—

"A seine constructed for the Bureau, which has proved very successful for the capture of sharks up to 6 or 8 feet in length, is 600 yards long, 18 feet deep, with 4-inch bar-mesh of 35-thread; top and bottom lines of ½-inch, 18-thread rope, fitted with seine-corks 5 inches in diameter placed 2 feet apart on the cork-line, with 4-oz. trap-leads with the same interspace on lead-line, the entire net being tarred. With this type of apparatus from 50 to 200 sharks have been taken in a single day's fishing, and during the brief period in which two of these nets have operated, approximately 2,000 sharks ranging in length from 3½ to 15 feet have been taken. For the purpose of taking the larger sharks a heavier net of larger mesh is required. One now under construction which the Bureau believes will prove satisfactory is 300 yards long, 12 feet deep, with 10-inch bar-mesh of 6-thread tarred cotton twine hung on ⅜-inch 12-thread rope, fitted with haul seine-corks 4 inches in diameter placed 3 feet apart on cork-line and 2-oz. round leads placed 6 feet apart on lead-line."

The method employed in British Columbia has proved equally satisfactory. The setting and lifting is done with a power-clutch, which allows of the gear being handled in rough weather and while the boat is in motion.

COMMERCIAL PRODUCTS OF THE INDUSTRY.

Oil.—The oil is the most important in value of the various products of the shark. The average amount per shark taken in the operations on this Coast amounts to $2\frac{7}{10}$ gallons. This was sold for about $1.75. The market price at the time the company operated ranged from 70 cents to $1 per gallon. At the present time the price ranges from 35 to 75 cents. Oil is obtained from the liver of the shark, the carcass being but slightly oleaginous, about 2 per cent. Shark-liver oil ranks high among fish-oils. It has a high iodine value and the refined product is fairly free from the usual disagreeable fishy odour. It is in constant demand as a body for paints for exterior surfaces, and when deodorized it can be used as a paint vehicle in place of linseed-oil with very satisfactory results. Combined with resin, shark-liver oil can be employed in making a cheap varnish, from which, with higher-grade gum, a first-class varnish product may be prepared.

Hides for Leather.—With the growing scarcity of mammal-hides used in the manufacture of leather, the United States Government a few years ago began research and experimental work in connection with the development of their aquatic resources. These experiments show that shark-hides can be successfully tanned and will produce a leather competing economically with the best of leathers made from the skins of animals. The Superintendent of Fisheries for the Dominion Government, who investigated the matter in 1919, reports that:—

"Experimenting in the tanning of the skins of certain sea-monsters, such as sharks and porpoises, has developed so that an excellent quality of leather is now being made therefrom, and a regular commercial industry is being carried on. You may also know that the Universal By-products Company has established a station at Edmonds, State of Washington, and I understand has carried on an important business there during the present summer. It has been represented to me that 350 sharks per day were taken during June and July on the coasts of Washington and Alaska, the skins of which were handled at Edmonds. It has been further stated that in capturing these animals, gear, approximately halibut-gear, was used, and the expenses of the operations were covered by the number of halibut taken.

"Another company operating on the east coast is now prepared to pay 10 cents per pound, f.o.b. at its tannery, for all the skins of such animals delivered there which are properly prepared.

"There is no serious difficulty in the skinning or preparation of the skins to ship to the tannery. The flesh adheres very closely to the skin, particularly on the back, and can only be removed by the use of a sharp knife, cutting the flesh close to the skin, great care being taken not to touch the skin, yet not to leave too much flesh. The skins should be split along the back, so that the sides and belly portion will be kept intact."

Shark-hides when tanned produce a very fine leather for the manufacture of suit-cases, club-bags, and other leather goods of this character. The hides have a tensile strength of from 3.905 to 4.742 lb. per square inch. The Veterans' Products Company realized from 10 to 15 cents a pound for the skins taken. The method of tanning shark-hides is that employed in the usual tanning, except that it has been found extremely difficult to remove the shagreen from the outside of the hide. This shagreen gives the hide an appearance of sandpaper and at one time was used for this purpose in the wood-working trade. The first method tried for removing shagreen was to have the hide first tanned and when dried the outer surface coated with oil and paraffin. It was then smooth-plated and shaved and gone over lightly on a rapidly revolving carborundum-wheel. This, however, did not produce a very good outer leather and two secret processes were evolved for removing it by chemical processes; one of these processes, given by the Bureau of Standards, Washington, is as follows:—

"Upon arrival the skins were cut into sides, in order to overcome the difficulty encountered in handling the whole skins, due to the two fin-holes in the middle of the body. The sides were soaked for twenty-four hours and then washed thoroughly. The washed skins were next transferred to a two-tenth of 1 per cent. solution of caustic soda in a paddle, where they were allowed

to remain for two days with occasional stirring. After treatment with caustic soda the skins were washed well and fleshed on a machine or by hand. The grain side, still very harsh, was beamed by hand with a blunt knife to remove as much of the shagreen as possible. Great difficulty has been encountered in removing the outer layer, which in appearance is very much like a rough sandpaper. By the caustic-soda treatment, however, it can be partly eliminated and the stock rendered suitable for certain grades of leather.

"The fleshed and beamed stock was next bated with ammonium chloride, using 3 per cent. on the weight of the stock at a temperature of 100° F. Following bating, the skins were washed and were then ready for the actual tanning operation. Several methods of tanning were employed, but the one giving the best results was as follows: The bated skins were placed in a drum with a solution containing 5 per cent. of sodium dichromate and 2½ per cent. of sulphuric acid, with 5 gallons of water to each 100 lb. of stock. When thoroughly penetrated the skins are horsed up overnight in order to allow the chrome to set. The following day the skins are returned to the drum and treated with a solution of 6 lb. of sodium bisulphite, using 4 gallons of solution to each 100 lb. of stock. The skins are run in the solution until the chrome is entirely reduced and then horsed up again overnight to complete dehydration.

"If desired, the skins, after the above chrome tanning, can be finished as is common practice for chrome-tanned stock. Better results, however, are obtained by giving the stock a retan as follows: The chrome-tanned stock is set out, shaved on the flesh, washed slightly, and then run in a solution of quebracho extract at 10° Bk. for one hour. The strength of the liquor is then increased to 30° Bk. and the stock run in this stronger liquor until struck through. When well struck through, the skins are put in a layer for five days, containing a 40° Bk. quebracho extract liquor.

"The tanned skins may be either fat-liquored or stuffed, according to the grade of leather desired. If it is to be finished on the grain, the stock is washed and coloured as desired and then fat-liquored with a heavy fat liquor, using soluble oil as the carrying agent. The fat-liquored skins are then dried out, sammied back, staked, tacked, and finished. The final finish should be of a nature that will lend itself to brushing.

"Very good results were obtained by hand-buffing the flesh and applying a cordovan finish. In doing this, however, it is necessary to stuff the leather rather than fat-liquor it. The stuffing which gave the best results consisted of a mixture of 3 lb. of tallow and 7 lb. of cod-oil on each 100 lb. wet weight, and was finally driven in with 3 lb. of sulphonated cod-oil in a small quantity of warm water. On drying out the leather should be sammied, staked, and hand-buffed. The buffed leather is then coloured by hand and a cordovan finish applied.

"Wearing tests were made on shoes made from shark-skins and showed exceptional durability."

More recent experiments have shown that the shagreen can be removed with a weak solution of hydrochloric acid. This, it is claimed, when properly handled does not injure the hide. This method has not been tried on the Pacific Coast as yet, but is under experiment. After proper tanning the shark-hides can be finished up in any manner desired. It makes a water-proof leather and the peculiar network construction of the hides makes it suitable for lace-leather possessing a very great strength.

Fish-meal for Stock and Poultry.—In addition to the oil and leather, sharks produce a further variety of product in the form of fish-meal and fertilizer manufactured from the carcasses, the protein contents of the fish being particularly high, and on this account can be used with other materials to produce a very desirable poultry and stock food. The business of making fish-meal for cattle and poultry food is a comparatively modern industry and at present there are only a few companies operating in British Columbia. This material produces 1 ton of finished meal to every 5 tons of fish used and can be treated under any one of the several different processes now in commercial use.

Shark-fins.—The Chinese consider shark-fins a great delicacy and there is a large demand. At present about 5 tons per month of dried shark-fins are imported at San Francisco, centre of the business on the Pacific Coast. The larger portion is supplied from Mexico, the balance from the Californian Coast, although a few small shipments are received from the East. The Chinese, who are the largest buyers, sell about one-tenth to the local trade and ship about

nine-tenths to China. There are considerable fluctuations in prices; the demand being constant, fluctuations are caused by the impossibility at times of obtaining adequate supplies. The market could absorb now at least three times the supply. Little, if any, distinction is made by the Chinese as to the species of shark from which the fins are taken, provided only that they are large enough to supply good-sized fins and that the fins are properly trimmed and cured. The fins should be cut off at the joint connecting them with the body, and, to be at its best, must have all the fleshy parts trimmed off, leaving only the true fin with its rays. It is these latter, the cartilaginous-like rays that compose the shark's fins, that are wanted and nothing else, so that all extraneous matter must be cut away. The only desirable fins are the dorsal, the pectoral, and the anal, the first being considered the best, while the caudal fins are worthless. These fins must be not less than 6 inches in length from tip to bottom, as otherwise the cartilaginous-like rays that compose the shark's fins are too short and small to be worth while, having no substance. The sizes most favoured are those running from 8 to 12 or 14 inches. To cure the fins all that is required is to dry them thoroughly in the sun, without salt or other treatment. When thoroughly dry they should be packed in cases or barrels containing about 250 lb., or in gunny-sacks to weigh 150 or 200 lb. Cases are most favoured, as they can be easily handled and there is less danger of breakage and loss of contents. The market price to-day—1921—is from 65 to 75 cents per pound for choice, but ranges much lower when the fins are carelessly trimmed or badly cured.

The Chinese in the Pacific Coast cities use the term "Yu Chee" for shark-fins. To prepare them for use they are soaked in water for two or three days, when the gelatinous rays separate out, and are then prepared and served in chicken broth, making a dish much relished by the Orientals.

At Chinese ports the imports of shark-fins are large. At Singapore, in the Straits Settlements, considerable amounts are imported to supply the 200,000 local Chinese, the supply coming from Borneo, Penang, Sarawak, Madras, Ceylon, Celebes, and the Coromandel Coast. The Malay shark, a man-eater, attains large size. Seventeen species inhabit the Far Eastern seas, some attaining a length of 25 feet. The basking shark, which ranges from the Cape of Good Hope to Ceylon, often exceeds 50 feet. It has small teeth and is not considered as dangerous as the monsters of the Malayan Archipelago.

The pioneer company in this industry spent considerable money in determining the possibilities of the industry and building up a market for each of the various products. It succeeded in definitely establishing the possibilities of the undertaking, but did not get the various details co-ordinated before its supply of capital was exhausted.

In 1920 the Department of Industries arranged for an experimental try-out of this equipment to produce results that would be definite and would show whether it could be made a success. It arranged for a crew of four men under Captain Pike to fish for one month. This crew had one boat employed and only one set of gear in use during this time. They fished for twenty-four days between October 20th and November 23rd. They caught 357 sharks, yielding 965½ gallons of oil, and marketed 225 hides, this being the number that were over 4½ feet long; 111 hides being thrown away owing to a misunderstanding that no shark under 4½ feet was to be skinned, whereas it should have been under 4 square feet. The oil was sold for $616.40 and the hides for $407, a total of $1,023.40. The company did not have facilities for handling the carcasses. If a plant was available for this purpose a further amount of $600 could have been realized, and, except for the mistake in respect to the hides, a further sum of $174 obtained on these hides. This would make a total of $1,797.40. The company at this time did not take into account the possibilities in respect to the fins. These were found to be in considerable demand at a later period and a good market exists, yielding from 50 cents to $1 per shark.

The running expenses during this period were $312, leaving a profit of $711, or $29.63 per day. Had the carcasses been treated and all the hides and fins marketed the profit would have been in excess of $1,500.

The following are the details in respect to this operation:—

Statement showing Number of Sharks caught (with Various Products of same) for Two Fishing Periods—October 21st to November 2nd and November 10th to 23rd, 1920, all inclusive.

Date.	No. of Sharks.		Total Sharks.	Gallons of Oil.	Hides, 4′ 6″ and over.
	Large.	Small.			
October 21	11	3	14	.....	...
„ 23	11	7	18	.....	...
„ 24	28	9	37	.....	...
„ 25	11	1	12	.....	...
„ 26	17	4	21	.....	...
„ 27	9	4	13	.....	...
„ 28	9	7	16	.....	...
„ 29	4	3	7	.....	...
„ 30	19	...	19	.....	...
„ 31	7	5	12	.....	...
November 1	13	8	21	.....	...
„ 2	1	8	9	.....	...
Totals, first period	140	59	199	470½	140
November 10	15	6	21	.....	...
„ 12	10	6	16	.....	...
„ 13	11	7	18	.....	...
„ 14	11	4	15	.....	...
„ 15	15	11	26	.....	...
„ 16	14	5	19	.....	...
„ 17	7	5	12	.....	...
„ 18	7	2	9	.....	...
„ 19	4	3	7*	.....	...
„ 20	1	3	4*	.....	...
„ 22	7	...	7*	.....	...
„ 23	4	...	4*	.....	...
Totals, second period	106	52	158	495	85
Grand totals	246	111	357	965½	225

* Prospecting-sets off Gossip Island.

Note.—These 357 shark-bodies (with heads) would in my estimation average 225 lb.; e.g., or a total of 40 tons in all. Figuring one-fifth of this as fertilizer would give 8 tons at, say, $75 per ton, a total of $600. This, of course, was all dumped into the sea. The money realized for oil was $616.40, the money realized for hides and exchange $407, making $1,023.40. Adding the $600 above would give $1,623.40 for twenty-four actual lifts (during this period there were only three days on which the boat could not pick up owing to weather—there is always the possibility of parting the gear in a rough sea). For the twenty-four days' fishing it would average sixty-eight per day. Appended is the running expenses and repairs to the C. & C. during this period. From this statement it would appear that the average liver-oil per shark is 2 7/10 gallons and the average weight of a hide 10⅝ lb. Might mention that when we shipped the 225 hides the net weight at C.P.R. platform was 2,960 lb. I have figured the average on the Seattle figure. There is a varying range in the size of sharks, running anywhere from 4 feet 6 inches to 12 feet 6 inches and one 13 feet 8 inches. Owing to a misunderstanding or other of last summer no shark under 4 feet 6 inches was skinned, whereas it should have been not under 4 square feet. Owing to this mistake 111 hides were thrown away, representing, at 10⅝ lb., $174.90, conservative estimate, say, of $140, which would bring the daily earnings of one boat to $73.80 for above period.

C. & C. Account.

Running Account—	Dr.	Cr.
Shark-liver oil	.....	$ 616 40
Hides and exchange	.....	407 00
Gasolene	$ 188 83	
Lubricating-oil	12 75	
Bait	68 50	
Repairs and wharfage	42 20	
Balance	711 12	
	$1,023 40	$1,023 40

During 1921 the A.B.C. Fisheries Company, Limited, attempted to carry on the shark-fishing industry. It operated successfully for several months, but did not get a fish-meal plant in operation. It marketed all its oil and established a good market for shark-fins, but found difficulty in respect to shipment of hides. The company did not have sufficient money to put in a fish-meal plant to handle the carcasses, with the result that its limited capital only provided for a very small operation.

All persons connected with this industry are convinced that there is a big future ahead of any company engaging in shark-fishing utilizing all the products in the production of oil, fish-meal, hides, and fins.

A good and successful industry can be built up in shark-fishing in conjunction with the destruction of sea-lions and hair-seals and the utilization of their flesh as bait for sharks. Markets exist for organic fertilizer that could be manufactured out of the surplus carcasses and stock-food made from the carcasses of the shark. A further market exists for the hides of hair-seals, sea-lions, and sharks. The establishing of an enterprise of this nature would, in the opinion of many fishermen, warrant it being bonused by way of bounties by the Government in its initial stage to ensure success, as the killing of hair-seals, sea-lions, and sharks will tend to conserve the fish-supply and eliminate pests that destroy, in addition to edible fish, valuable fishing-gear.

The experimental work that has been done so far has been sufficient to convince the people prominent in the whaling and fishing industry that there is a great future before a company engaging in this business with the proper technical assistance. For some time past the market for oil and fish-meal has been steadily rising, and the Department of Industries will be pleased to place at the disposal of any persons interested in an enterprise of this nature all the information in its possession.

(5.) STATEMENT SHOWING ALL LOANS APPROVED BY THE DEPARTMENT TO DATE.

Name.	Industry.	Location.	Loan.
Canada Western Cordage Co., Ltd.	Cordage	New Westminster	$250,000 00
Western Toy & Furniture Co., Ltd.	Toy and furniture factory	Vancouver	34,000 00
Barclay Sound Fisheries	Salting and curing fish	Barclay Sound and Vancouver	10,000 00
Sunset Woodworkers	Wood-workers	Vancouver	3,000 00
Frank Beatson	Piston-rings	„	1,000 00
T. Bennett & Son	Furniture	„	5,000 00
Kerr Manufacturing Co.	Neckwear	„	4,000 00
Peerless Products, Ltd.	Ink and mucilage	„	1,000 00
Cut-to-Fit Building Co., Ltd.	Homes	New Westminster	50,000 00
Sidney Roofing & Paper Co., Ltd.	Building-felt, building-paper, roofing, beaver-board, and box-board	Victoria	100,000 00
Canada Western Woodworkers, Ltd.	Furniture and woodwork	„	15,000 00
H. L. Finlayson	Ladies' waists	Vancouver	2,000 00
Frank Vinall & Son	Furniture	Victoria	1,000 00
Automobile Body Builders	Truck and auto bodies	Vancouver	1,500 00
Tait Pipe & Foundry Co., Ltd. (formerly Vancouver Pipe & Foundry Co.)	Cast-iron pipe, soil-pipe, school-desks, etc.	„	30,000 00
Brin du Chatelet	Model-maker	Tofino	500 00
Alfred and Harold Eckley, Pacific Standard Motor Works	Marine engines	Vancouver	7,700 00
E. J. Wakefield	Willow holt	„	1,500 00
Vancouver Island Fish & Cold Storage Co., Ltd.	Fish-curing	Nanaimo	7,500 00
Wholesale Fish Co.	„	Victoria	2,500 00
H. Thompson *et al.*, operating as the Green River Lumber Co.	Sawmill	Rethel	12,000 00
Veterans' Products Co., Ltd.	Fish-fertilizer	Victoria	17,000 00
Vivian Gas Engine Works	Gas-engines	Vancouver	20,000 00
Ordano Bros.	Boat-building	Cowichan Bay	1,400 00
Henson & Dyson	Concrete blocks	Victoria	4,000 00
Acme Box Co.	Small wooden boxes	Vancouver	6,000 00
Aetna Saw Works, Ltd.	Saws	„	15,000 00

STATEMENT SHOWING ALL LOANS APPROVED BY THE DEPARTMENT TO DATE—*Continued.*

Name.	Industry.	Location.	Loan.
Great West Manufacturing Co., Ltd.	Cut-to-fit houses	Vancouver	$ 20,000 00
Pacific Guano Co., Ltd.	Fish oil and meal	,,	5,000 00
N.M. & R. Fish Co.	Fish company	Prince Rupert	25,000 00
Canadian Western Woollen Mills, Ltd.	Blankets and tweeds	Vancouver	30,000 00
Stettler Cigar Factory, Ltd.	Cigar-factory	,,	25,000 00
Pacific Crating & Manufacturing Co.	Box-shooks and crating	Sidney Island	10,000 00
Canada Dolls, Ltd.	Toys	Vancouver	7,500 00
Laidlaw Shingle Co., Ltd.	Shingles	Squawtits Island	4,900 00
Alberni Shingle Co., Ltd.	,,	Port Alberni	11,000 00
Ceramic Industries, Ltd.	Bricks	Vancouver	15,000 00
Erskine & May	Sawmill	Merville	6,500 00
Heaton Machine Works	Machinery	Vancouver	5,000 00
McLeod & Movitz	Sawmill	Courtenay	2,500 00
Merritt Industries, Ltd.		Merritt	7,500 00
Jorgensen & Anthony	Canned goods	Vancouver	500 00
Maddaugh, Huggard & Nichols	Sawmill	Langley Prairie	26,658 48
Electrical Manufacturing Co.	Electrical appliances	Vancouver	5,700 00
B.C. Yacht & Boat Builders Co., Ltd.	Boat-building	Victoria	15,000 00
Wonder Pump & Engine Co.	Pumps and engines	Vancouver	10,000 00
Hiker Manufacturing Co., Ltd.	Children's mechanical vehicles	Victoria	8,000 00
McBride-Wells Co.	Labelling and reconditioning of canned goods	Vancouver	1,000 00
Quigley Knitting Co., Ltd. (formerly the Vancouver Knitting Co.)	Woollen garments	,,	19,000 00
P. E. George	Gramaphones	Victoria	2,000 00
John Arnot & Sons	Wood-workers	Vancouver	2,500 00
J. R. Tracy & Son	Auto plates and names	,,	15,000 00
Reynolds & Coote	Shingle-mill	Mission	10,000 00
T. H. Waters & Co., Ltd.	Wood-workers and clothes-pin manufacturing	Nelson	15,000 00
Standard Shoe Manufacturing Co., Ltd.	Boots and shoes	Vancouver	15,000 00
H. L. Johnson	Antique furniture	Victoria	300 00
San Juan Box Co., Ltd.	Boxes	Port Renfrew	35,000 00
Vancouver Pickle Co., Ltd.	Pickles	Vancouver	5,000 00
Victory Attachable Rubber Soles & Heels Co.	Rubber soles and heels	Victoria	2,000 00
Raemaekers & Stephen Bros.	Ventilating appliances	Vancouver	1,500 00
T. J. Shore Bolt & Nut Manufacturing Co., Ltd.	Bolts, nuts, spikes, and rivets	,,	45,000 00
Henshall Fish Products, Ltd.	Fish products	Sooke	3,000 00
Schaake Co., Ltd.	Sawmill and shingle-mill machinery	Vancouver	50,000 00
Kelley-Johnson Lumber Co., Ltd.	Sawmill	Sooke	6,500 00
Quesnel Timber & Trading Co., Ltd.	,,	Quesnel	15,500 00
Canada Silica Works, to be known as the Western Abrasive Paper Co., Ltd.	Sandpaper	Victoria	22,000 00

LIST OF LOANS APPROVED, NOT TAKEN UP THROUGH NON-COMPLIANCE WITH CONDITIONS.

Name.	Industry.	Location.	Loan.
F. H. Hill & H. C. Lancaster	Electroplated fixtures	Victoria	$ 1,500 00
B.C. Coast Fisheries	Fish company	New Westminster	15,000 00
Thomas & Julian Fisheries	,,	Vancouver	12,500 00
Dominion Woodworkers	Wood-workers	,,	1,500 00
B.C. Nurseries	Fruit-tree raising	Sardis	7,500 00
Sayward Trading Co.	Sawmill	Sayward	5,000 00
Bird & Gray	,,	Saltspring Island	3,500 00
E. R. Crumner	Broom-protectors	Vancouver	200 00
G. H. Waller	Special furniture	,,	2,000 00
Douglas Fir & Turpentine Co.	Turpentine	,,	25,000 00

(6.) RECEIPTS AND DISBURSEMENTS FROM DEVELOPMENT FUND.

RECEIPTS.		DISBURSEMENTS.	
To Balance at credit of fund, January 1st, 1921	$ 9,547 64	By Disbursements on account of loans granted	$223,899 75
Advances from Provincial Treasury	160,000 00	Balance at credit of fund, December 31st, 1921	14,687 60
Refunds of loans and interest	69,039 71		
	$238,587 35		$238,587 35

(7.) LOANS REPAID IN FULL.

	Amount of Loan.
Beatson, Frank	$ 1,000 00
Johnson, H. L.	300 00
Kelley-Johnson Lumber Co.	6,500 00
McBride, Wells & Co.	1,000 00
Vinall, F., & Sons	1,000 00
Standard Shoe Manufacturing Co., Ltd.	15,000 00
	$24,800 00

Directory of British Columbia Products.

Abrasives.

Western Abrasive Paper Company, Ltd., 913 Mason Street, Victoria.

Acetate of Lime.

Acetate Products, Ltd., New Westminster.

Acetylene.

Compressed Gas Company, Ltd., 1530 Hastings Street East, Vancouver. "Our Own C.G.C.O."
L'Air Liquide Society, Yukon and Fifth Avenue, Vancouver.

Acids.

Giant Powder Company of Canada, Ltd., Victoria.
Nichols Chemical Company of Canada, Barnet.
Victoria Chemical Company, Ltd., Victoria.

Adhesives.

Columbia Printing & Roller Company, Vancouver.
Laboratories & Manufacturing Company, Cordova and Cambie Streets, Vancouver.
Peerless Products, Ltd., 1642 Pandora Street, Vancouver. "Peerless."

Aeroplanes.

Hoffar Motor Boat Company, Vancouver.

Alcohol, Industrial.

British Columbia Distillery Company, Ltd., New Westminster.

Alcohol, Wood.

Acetate Products, Ltd., New Westminster.

Ale.

British Columbia Breweries, Ltd., Vancouver.
Enterprise Brewing Company, Revelstoke.
Fernie-Fort Steele Brewing Company, Fernie.
Phoenix Brewing Company, Phoenix.
Rainier Breweries, Ltd., Kamloops.
Victoria Phoenix Brewing Company, Ltd., Victoria.
Westminster Breweries, Ltd., New Westminster.

Ammonia.

Kelly Confection Company, Ltd., 1106 Mainland Avenue, Vancouver.
W. J. Pendray & Sons, Ltd., Victoria. "Pendray's."
W. H. Malkin Company, Ltd., Vancouver. "Tropical."

Ammonia, Sulphate of.

Granby Consolidated Mining, Smelting & Power Company, Vancouver.

Anchors.

Hendry Foundry Company, 360 Front Street West, Vancouver.
Mainland Engineering Works, 503 Powell Street, Vancouver.
Progressive Engineering Works, Ltd., 900 Powell Street, Vancouver.
Ross & Howard Iron Works, Ltd., foot of Woodland Drive, Vancouver.
Vancouver Engineering Works, Ltd., 519 Sixth Avenue West, Vancouver.
Victoria Machinery Depot, Victoria.

APPLES, EVAPORATED.

Graham Company, Ltd., Vernon.
O.U.G. Fruit Products, Ltd., Vernon.

APRONS.

Campbell, J. W., Ltd., 151 Hastings Street West, Vancouver.
Thomson & Sons, Ltd., James, Vancouver. "Twin Bute."
Turner, Beeton & Company, Ltd., Victoria. "Big Horn."

ASPHALT.

Ayres Varnish & Paint Company, Vancouver.
Barrett Company, Ltd., Vancouver.
Imperial Oil, Ltd., Ioco.
Pacific Roofing Company, Vancouver.
Sidney Roofing & Paper Company, Victoria.
Western Industrial Development Company, Vancouver.

AUTOMOBILE BODIES, TOPS, AND TRIMMINGS.

Abercrombie & Craig, 1460 Seventh Avenue West, Vancouver.
Automobile Body Builders, 1253 Howe Street, Vancouver.
B.C. Auto Top Co., 1251 Howe Street, Vancouver.
Berry, J., 135 Broadway East, Vancouver.
Black Brothers, Ltd., 1115 Homer Street, Vancouver.
Cox & Perkins, 931 View Street, Victoria.
Grimm Brothers, 650 Pembroke Street, Victoria.
Hall & Wallace Automobile & Carriage Works, 573 Beatty Street, Vancouver.
Hurren, W. M., 1369 Richards Street, Vancouver.
Meston, John, & Company, Ltd., 1407 Broad Street, Victoria.
Pioneer Auto and Carriage Works, 966 Richards Street, Vancouver.
Roote Auto Top Co., 740 Pacific Street, Vancouver.
Sanders Auto Top Company, 928 Johnson Street, Victoria.
Truck & Auto Body Builders, 1067 Richards Street, Vancouver.
Tupper & Steele, Ltd., 1669 Third Avenue West, Vancouver.
Victoria Auto Rebuilding Factory, Caledonia and Blanshard Streets, Victoria.

AUTOMOBILE NAME-PLATES.

Tacey, J. R., & Son, 550 Sixth Avenue West, Vancouver.

AUTO WINDSHIELDS.

Tonneau Windshield Company, 1272 Granville Street, Vancouver.

AWNINGS.

Davidson, L. H., Vernon.
Grant-Holden-Graham, Ltd., 1260 Hamilton Street, Vancouver.
Hoskin, John W., 41 Sixth Avenue, New Westminster.
Jones, C. H., & Son, Ltd., 28 Water Street, Vancouver.
Jeune, F., & Bro., Ltd., Victoria.
Lipsett, Cunningham & Co., Ltd., Prince Rupert.
Lipsett, Ed., 68 Water Street, Vancouver.
May, John, Nanaimo.
Nugent, H. M., & Company, 48 Water Street, Vancouver.
Rigby, George, 828 Fisgard Street, Victoria.
Victoria Tent Factory, 618 Pandora Street, Victoria.

BABBITT METAL.

Canada Metal Company, Ltd., 1428 Granville Street, Vancouver.
Great Western Smelting & Refining Company, 146 Dufferin Street East, Vancouver.

Bags, Camping and Sleeping.

F. Jeune & Bro., Ltd., Victoria.
Grant-Holden-Graham, Ltd., 1260 Hamilton Street, Vancouver.
Jones, C. H., & Son, Ltd., 28 Water Street, Vancouver.
Lipsett, Edward, 68 Water Street, Vancouver.
Nugent, H. M., & Company, 48 Water Street, Vancouver.
Turner, Beeton & Co., Victoria.

Bags, Jute and Cotton.

Canadian Bag Company, 1152 Mainland Street, Vancouver.
Woods Manufacturing Company, Ltd., 318 Homer Street, Vancouver.

Bags, Leather.

(*See* Leather Bags, Trunks, etc.)

Baits, Spoon.

Clendon Tool & Stamping Works, 135 Hastings Street West, Vancouver.
Gibbs Tool & Stamp Works, 356 Dufferin Street West, Vancouver.
Lenfesty, W. N., 1324 Government Street, Victoria.

Barrels.

Canadian Western Cooperage, Ltd., Victoria and Vancouver.

Baskets, Willow.

Wakefield, E. J., 56 Dufferin Street East, Vancouver.

Bathing-suits, Knitted.

Pride of the West Knitting Mills, Ltd., 500 Beatty Street, Vancouver. "Pride of the West."
Quigley Knitting Mills, Ltd., 78 Dufferin Street East, Vancouver. "Q."
Universal Knitting Company, 303 Pender Street West, Vancouver. "Universal."

Batteries.

Guaranteed Auto Services, 548 Georgia Street, Vancouver.

Beds.

Restmore Manufacturing Company, Ltd., Vancouver. "Restmore."
Simmons, Ltd., 2034 Eleventh Avenue West, Vancouver. "Simmons."

Bee Supplies.

Beaton, R., Matsqui.
Derrick, H. C., 4103 Pandora Street, Vancouver.
McLeod Sash & Door Company, Ltd., 1251 Charles Street, Vancouver.
Nelson Hardware Company, Nelson.

Beer, Lager.

British Columbia Breweries, Ltd., Vancouver.
Fernie-Fort Steele Brewing Company, Fernie.
Nelson Brewing Company, Nelson.
Ranier Breweries, Ltd., Kamloops.
Silver Spring Brewing Company, Victoria.
Vernon Brewery, Vernon.
Victoria-Phoenix Brewing Company, Victoria.
Westminster Brewery, New Westminster.

Benzol.

Granby Consolidated Mining, Smelting & Power Company, Vancouver.

Benzene.

Imperial Oil Company, Ioco.

BINDER-TWINE.

Canada Western Cordage Company, Ltd., New Westminster.

BISCUITS.

National Biscuit & Confection Company, Ltd., 1706 First Avenue West, Vancouver. "Red Arrow"; "National."
Ormonds, Ltd., Victoria.
Ramsay Brothers & Company, Ltd., 990 Powell Street, Vancouver. "Family"; "Best by Test."

BLANKETS.

Canada Western Woollen Mills, Ltd., 440 Clark Drive, Vancouver.

BLASTING-POWDER.

Canadian Explosives, Ltd., Vancouver.
Giant Powder Company of Canada, Ltd., Victoria.
Sabulite Explosives, Ltd., Port Coquitlam.

BLOUSES.

Batiste Costume Company, 445 Granville Street, Vancouver.
Comfort Blouse Manufacturing Company, 367 Granville Street, Vancouver.
Dall Lace Company, Ltd., 615 Granville Street, Vancouver.
Finlayson, H. L., 318 Homer Street, Vancouver.
Vanity Waist & Neckwear Company, Ltd., 136 Water Street, Vancouver.

BLUE, LAUNDRY.

B.C. Products, Ltd., 860 Cambie Street, Vancouver.
Kelly Confection Company, Vancouver.
Pendray & Sons, Ltd., W. J., Victoria. "Pendray's."
Royal Crown Soap Company, Ltd., Vancouver.

BOAT AND LAUNCH BUILDERS.

Beach Avenue Shipyards, 964 Beach Avenue, Vancouver.
B.C. Yacht & Boat Builders Company, Ltd., Point Hope, Victoria.
Bourne, Alfred, 1869 Georgia Street West, Vancouver.
City Boat House, Ladysmith.
Cates & Son, North Vancouver.
Chappell Brothers, foot of Denman Street, Vancouver.
Columbia Motor Works, Cowichan Bay.
Cranes Shipyard, Ltd., North Vancouver.
Dafoe, V. M., 1200 Powell Street, Vancouver.
Davidge, J., Maple Bay.
Dopson, S., Alberni.
Durant, C., Nahun.
Elford Boat Company, Nelson.
Easthope Brothers, 129 Georgia Street West, Vancouver.
Ericksen Brothers, North Vancouver.
Frisbee, Walter, Ewing's Landing.
Hale's Boatyard, Nelson.
Hoffar Motor Boat Company, 1969 Georgia Street West, Vancouver.
Jones, A. J., Kelowna.
Layland Brothers & Swan, Deep Cove.
Leighton, Peter, Metlakatla.
Lindsay Pleasure Boats, Ltd., 916 Powell Street, Vancouver.
Linton, A., & Company, Ltd., 1737 Georgia Street West, Vancouver.
Masters, H. A., McDonald's Landing.
Masters, H. A., Nelson.
Menchions, W. R., 1705 Georgia Street West, Vancouver.

Boat and Launch Builders—*Continued.*

Mercer Star Shipyard, Lulu Island.
Okanagan Lake Boat Company, Ltd., Naramata.
Orwig, T. M., Prince Rupert.
Pascoe & Company, Ltd., Georgia and Denman Streets, Vancouver.
Port Alberni Shipyards, Port Alberni.
Port Alberni Boat & Launch Works, Port Alberni.
Prince Rupert Boathouse, Prince Rupert.
Queensboro Shipyard, New Westminster.
Turner, William, 1963 Georgia Street West, Vancouver.
Vancouver Shipyards, Ltd., 1877 Georgia Street West, Vancouver.
Volmers, H., Nanaimo.
Wallace, S. R., North Vancouver.
Wickham, Bamfield.
Winslow, John, 441 Seymour Street, Vancouver.

Boilers.

Atlas Boiler Works, First Avenue, Prince Rupert.
B.C. Iron Works, Government and Princess Streets, Victoria.
Blain, A., 1147 Venables Street, Vancouver.
Gurney Foundry Company, Ltd., 566 Beatty Street, Vancouver.
National Machinery Company, 925 Main Street, Vancouver.
Marine Iron Works, Pembroke Street, Victoria.
Progressive Engineering Works, Ltd., 900 Powell Street, Vancouver.
Patterson Boiler Works, 750 Alexander Street, Vancouver.
Ross & Howard Iron Works Company, Ltd., Vancouver.
Vancouver Boiler Works, 456 Dufferin Street West, Vancouver.
Vancouver Engineering Works, 519 Sixth Avenue West, Vancouver.
Vancouver Machinery Depot, 1155 Sixth Avenue West, Vancouver.
Victoria Machinery Depot, Victoria.
Vulcan Iron Works, Ltd., Granville Island, Vancouver.
Wonder Pump & Engine Company, 931 Pender Street West, Vancouver.
Yarrows, Ltd., Victoria.
Wain, C. L., Kamloops.
Wallace Shipbuilding & Drydock Co., North Vancouver.

Bolts.

Canadian Northwest Steel Company, Front Street East, Vancouver.
Hafer Machine Company, 1720 Store Street, Victoria.
Ross & Howard Iron Works Company, Ltd., Vancouver.
T. J. Shore Bolt & Nut Manufacturing Co., Ltd., Vancouver.
Vancouver Engineering Works, Vancouver.
Watt Company, Ltd., The Thomas, 225 Fifth Avenue West, Vancouver.

Boots and Shoes.

Christie Boot Factory, 51 Cordova Street West, Vancouver. "Christie."
Inrig, Alfred, 319 Hastings Street West, Vancouver.
J. Leckie Company, Ltd., 220 Cambie Street, Vancouver. "Leckie"; "Skookum"; "Seal of Quality."
MacLachlan-Taylor Company, 63 Cordova Street West, Vancouver.
Paris, P., 53 Hastings Street West, Vancouver.
Standard Shoe Manufacturing Company, 319 Hastings Street West, Vancouver. "Standard."
Yates, A., 1840 Powell Street, Vancouver.

Boxes, Cigar.

Acme Box Company, 1067 Richards Street, Vancouver.

BOXES, PAPER.

Davis Paper Company, Ltd., 1670 Pandora Street, Vancouver.
Dominion Carton & Printing Works, Ltd., Vancouver.
National Paper Box & Carton Company, Ltd., 160 Lorne Street West, Vancouver.

BOXES, WOODEN.

Arbuthnot Lumber Sash & Door Company, 101 Dufferin Street West, Vancouver.
Armstrong Sawmills, Armstrong.
B.C. Box Company, Ltd., Vancouver.
B.C. Manufacturing Company, Ltd., New Westminster.
British Columbia Mills, Timber & Trading Company, Vancouver.
Brunette Sawmills, Ltd., New Westminster.
Cameron Lumber Company, Ltd., Victoria.
Crawford Brothers, Ltd., Kelowna.
Dalzel Box Company, Victoria.
Georgetown Sawmills Company, Ltd., Prince Rupert.
Kelowna Sawmills Company, Kelowna.
Kootenay Wire Works Manufacturing Company, Ltd., Nelson.
Leigh & Sons, James, Victoria.
Lemon-Gonnason Company, Ltd., Victoria.
Laminated Materials Company, Ltd., New Westminster.
Lumber Products, Ltd., Vancouver.
Norris Lumber & Box Company, Ltd., Grand Forks.
Northern B.C. Fisheries, Ltd., Vancouver.
North Vancouver Box Co., 429 Pender Street West, Vancouver.
Okanagan Wood Products Company, Chute Lake.
Pacific Box Company, Ltd., Vancouver.
San Juan Box Company, Ltd., Port Renfrew.
Sidney Mills, Ltd., Victoria.
Summerland Lumber Company, Ltd., Summerland.
Waters & Company, Ltd., T. H., Nelson.
Westminster Box & Shingle Mills, Ltd., New Westminster.
Western Box & Shingle Company, Nelson.
Wynndel Box Company, Wynndel.

BRASSFOUNDRIES.

Smith Brothers, 630 Pembroke Street, Victoria.
Star Brass Foundry, 194 Lorne Street West, Vancouver.
Sumner Brass Foundry, 610 Bidwell Street, Vancouver.
Vancouver Brass Works, 1304 Keefer Street, Vancouver.
Victoria Brass & Iron Works, Esquimalt.
Wilson Brass Foundry, 22 Dufferin Street East, Vancouver.

BRASS SIGNS.

Hewitt, G. H., & Company, Ltd., 653 Seymour Street, Vancouver.
Houghton & Evans, 516 Pender Street West, Vancouver.
Zemel Signs, 522 Pender Street West, Vancouver.

BRICK.

Bazan Bay Brick & Tile Company, Ltd., Sidney.
(New) Baker Brick & Tile Company, Ltd., Victoria.
Clayburn Company, Ltd., Clayburn and Kilgard.
Ceramic Industries, Ltd., Granville Island, Vancouver.
Enderby Brick Company, Ltd., Enderby.
Gabriola Shale Products, Ltd., Gabriola Island.
Humber Brick Company, Victoria.
Johnson & Company, Ltd., Kamloops.

Brick—*Continued.*

Lakeside Clay Products, Ltd., Okanagan Landing.
Polychrome Cement Brick & Tile Company, Ltd., Granville Island, Vancouver.
Port Haney Brick Company, Ltd., Port Haney.
Sidney Island Brick & Tile Company, Sidney Island.
Terrace Brick Company, Terrace.
Victoria Brick Company, Ltd., 3001 Douglas Street, Victoria.

Brooms.

B.C. Brush Works, Ltd., 722 Cambie Street, Vancouver. "B.C. Brush."
Crown Broom Works, Ltd., 304 Front Street East, Vancouver. "Duchess"; "Mother Goose"; "Janitor's Special"; "Province"; "Peerless"; "Ladies' Carpet"; "Princess"; "Perfection"; "Favorite"; "Warehouse"; "Little Pearl."
Western Broom Works, 631 Fifteenth Avenue East, Vancouver.

Brushes.

B.C. Brush Works, Ltd., 722 Cambie Street, Vancouver.

Building-paper.

Barrett Company, Ltd., Vancouver. "Victoria"; "Western"; "Anchor"; "Stag."
Pacific Roofing Company, Ltd., Vancouver. "Silver Tip"; "Krafelt."
Sidney Roofing & Paper Company, Ltd., Victoria. "Kraft"; "Capital"; "Esquimalt."

Calcium Carbonate.

Calcium Carbonate Company, Ltd., Merritt.

Cans, Tin.

American Can Company, Ltd., Vancouver. "Canco."

Caps.

Western Cap Company, 405 Vernon Drive, Vancouver.

Capsules.

B.C. Pharmacal Company, Ltd., Vancouver.

Carriage-builders.

Chafe & Jones, 642 Discovery Street, Victoria.
Grimm Brothers, Victoria.
Hall & Wallace, 573 Beatty Street, Vancouver.
Mable, W. J., 717 Johnson Street, Victoria.
Pioneer Auto & Carriage Works, 966 Richards Street, Vancouver.
Tupper & Steele, Ltd., 1669 Third Avenue West, Vancouver.

Carriages, Baby.

Shaw Manufacturing Company, Ltd., Telford Avenue, West Burnaby.

Caskets.

Kamloops Undertaking Company, Kamloops.
Imperial Casket Company, 425 Dufferin Street West, Vancouver.
Vancouver Casket Company, 1650 First Avenue West, Vancouver.

Catchup.

Broder Canning Company, Ltd., New Westminster. "Fraser Valley"; "Royal City."
Dominion Canners, B.C., Ltd., Vancouver. "Quaker."
Empress Manufacturing Company, 1106 Homer Street, Vancouver. "Empress"; "Climax."
Lyons, F., & Company, 1500 Main Street, Vancouver.

CATCHUP—*Continued.*

Occidental Fruit Company, Ltd., Kelowna. "Okanagan."
Vancouver Pickle Company, Ltd., Granville Island, Vancouver. "Rainbow."
Western Pickling Works, View Street, Victoria. "Camosun."

CEMENT.

British Columbia Cement Company, Ltd., 305 Belmont House, Victoria.

CHARCOAL.

Acetate Products, Ltd., New Westminster.

CIDER.

Dyson Vinegar Company, Ltd., 1365 Powell Street, Vancouver.
O.U.G. Fruit Products, Ltd., Vernon.
Syms, W. T., Salmon Arm.
Thorpe & Company, Ltd., Victoria and Vancouver.
Van Brothers, Vancouver.

CIGARS.

B.C. Cigar Factory, Seventh Avenue and Cunningham Street, New Westminster. "B.C."; "Old Sport"; "Brilliant."
Beaver Cigar Factory, 717 Carnarvon Street, New Westminster. "Beaver"; "Templar."
Buck-a-Roo Cigar Company, 610 Cormorant Street, Victoria.
Dorembecker, George, Fernie.
Gable, Philip, & Company, Nanaimo.
Mainland Cigar Factory, 2104 Hastings Street East, Vancouver.
Parsons & Reynolds, 1022 Seymour Street, Vancouver. "P. & R."
Province Cigar Factory, 576 Johnson Street, Victoria. "Province."
Stettler Cigar Factory, Ltd., 140 Water Street, Vancouver. "Van Loo"; "Van Dyck."
Solo Special Cigar Factory, 520 Columbia Street, New Westminster. "Solo Special"; "La Trenica."
Terminus Cigar Factory, 738 Fifteenth Avenue East, Vancouver.
Western Cigar Manufacturing Company, Ltd., Kamloops. "Master Duke"; "Seal of B.C."; "Daily Service."
Kurtz & Company, 1129 Haro Street, Vancouver. "Kurtz Pioneer"; "Royal Honor."

CLAMS, CANNED.

Oyster Bay Canning Company, Ladysmith.
Saanich Canning Company, Ltd., Sidney. "Saanich Brand."
Sidney Canning Company, Sidney.

CLOAKS, SUITS, AND COSTUMES, LADIES'.

Carstens, Ltd., 1206 Homer Street, Vancouver.
Western Cloak & Suit Company, 1200 Homer Street, Vancouver.

CLOTH, JERSEY.

Quigley Knitting Company, 78 Dufferin Street, Vancouver.

CLOTH, TWEED.

Canada Western Woollen Mills, Ltd., 440 Clark Drive, Vancouver.

CLOTHES-PINS, SPRING.

Waters, T. H., Nelson.

CLOTHING, MEN'S.

Campbell, George A., & Company, 500 Beatty Street, Vancouver.
Guarantee Wholesalers, Ltd., 806 Granville Street, Vancouver.

Coal.

Canadian Collieries (Dunsmuir), Ltd., Victoria.
Canadian Western Fuel Company, Nanaimo.
Chu Chua Coal Company, Kamloops.
Coalmont Collieries, Ltd., Coalmont.
Corbin Coal & Coke Company, Ltd., Corbin.
Crow's Nest Pass Mining Company, Ltd., Fernie.
East Wellington Coal Company, Nanaimo.
Fleming Coal Company, Merritt.
Granby Consolidated Mining & Smelting Company, Ltd., Cassidy.
King, A. G., & Foster, E. R., Nanaimo.
Nanoose-Wellington Collieries, Ltd., Wellington.
Pacific Coast Coal Mines, Ltd., Victoria.
Princeton Coal & Land Company, Ltd., Princeton.

Coffee Packers and Grinders.

Braid & Company, Ltd., William, Vancouver. "Braid's Best"; "Big Four"; "Ideal"; "Plantation"; "Combination."
Carey, C. J., 638 View Street, Victoria.
Dickson's Importing Tea & Coffee Company, 317 Columbia Street, Vancouver.
Empress Manufacturing Company, Ltd., Vancouver. "Empress"; "Climax."
Jameson Coffee Company, W. A., Victoria. "Jameson's"; "Turkish"; "Italiana."
Kelly, Douglas & Company, Ltd., Vancouver. "Nabob."
Malkin Company, Ltd., W. H., Vancouver. "Malkin's Best"; "Victoria Cross."

Coffins and Caskets.

Imperial Casket Company, 425 Dufferin Street West, Vancouver.
Kamloops Undertaking Company, Kamloops.
Vancouver Casket Company, 1650 First Avenue West, Vancouver.

Colours in Oil.

Ayres Varnish & Paint Company, Ltd., Raymur and Parker Streets, Vancouver.
Brandram-Henderson, Ltd., Vancouver.
British American Paint Company, Ltd., Victoria.
Crown Paint Company, Ltd., Vancouver.
Darling & Son, Henry, 28 Powell Street, Vancouver.
Martin-Senour Company, Ltd., Vancouver.
National Paint Company, Vancouver.
Staneland Company, Ltd., Victoria.
Williams, Stanner & Harte, Ltd., 1302 Wharf Street, Victoria.

Compounds, Washing.

Golden Rule Manufacturing Company, 622 Campbell Avenue, East Burnaby. "Golden Rule."
Pendray & Sons, Ltd., W. J., Victoria. "White Swan."
Radio Manufacturing Company, Vancouver.
Royal Crown Soap, Ltd., 308 Georgia Street West, Vancouver. "Royal Crown."
Wonder Manufacturing Company, Vancouver.
Woodley Manufacturing Company, Ltd., 2188 Wall Street, Vancouver.

Copper, Blister.

Consolidated Mining & Smelting Company of Canada, Ltd., Vancouver.
Granby Consolidated Mining, Smelting & Power Company, Ltd., Vancouver.

Copper, Refined.

Consolidated Mining & Smelting Company of Canada, Ltd., Vancouver.

COPPER RODS.

Consolidated Mining & Smelting Company of Canada, Ltd., Vancouver.

CORDAGE, MANILA, SISAL, AND HEMP.

Canada Western Cordage Company, Ltd., New Westminster.

COUNTERS, WOODEN, STORE.

(*See* Show-cases.)

CRATES, EGG.

Canadian Queen Manufacturing Company, foot of Smythe Street, Vancouver.

CREOSOTE.

Republic Creosoting Company, Vancouver.

CREOSOTING-WORKS.

Dominion Creosoting & Lumber, Ltd., Vancouver.
Vancouver Creosoting Company, Ltd., North Vancouver.

CRIBS, CHILDREN'S.

Red Cross Workshops, Vancouver.
Province Furniture Company, 115 Victoria Drive, Vancouver.
Dowling Manufacturing Company, 266 Dufferin Street East, Vancouver.
Restmore Manufacturing Company, Ltd., Vancouver. "Restmore."
Simmons, Ltd., 2034 Eleventh Avenue West, Vancouver. "Simmons."

DESKS, SCHOOL.

C. Marston Cabinet Works, 3764 Commercial Drive, Vancouver.
Tait Pipe & Foundry Company, Ltd., 500 Beatty Street, Vancouver.

DEXTRINE.

Dominion Starch & Dextrine Company, Ltd., New Westminster.

DIES.

Clendon Tool & Stamping Works, 135 Hastings Street West, Vancouver.
Gibbs Tool & Stamping Works, 356 Dufferin Street West, Vancouver.
Hall Machine Works, Vancouver.
Hewitt Company, Ltd., The Geo. H., 653 Seymour Street, Vancouver.
Houghton & Evans, 303 Hastings Street West, Vancouver.
Murray-Latta Machine Works, foot of Bidwell Street, Vancouver.

DISINFECTANTS.

Western Industrial Development Company, Vancouver. "Creola."
Barrett Company, Ltd., Marpole. "Carbonal"; "Pyxol."

DOLLS.

Canada Dolls, Ltd., 4349 Victoria Drive, Vancouver.

DUSTERS.

Dust Control Company, 2246 Commercial Street, Vancouver.

DYNAMITE.

Canadian Explosives, Ltd., Vancouver.
Giant Powder Company of Canada, Ltd., Victoria.
Sabulite Explosives, Ltd., Port Coquitlam.

Electrical Appliances.

Cope & Son, 100 Front Street East, Vancouver.
Electrical Manufacturing Company, Granville Island, Vancouver.
Farr, Robinson & Bird, Ltd., 546 Howe Street, Vancouver.
Lang Electrical Fixture Company, Granville Island, Vancouver.

Electrophones.

Premier Phonograph Company, Garbally Road, Victoria.

Elevators.

Westminster Iron Works, Ltd., New Westminster.

Engines, Gas and Gasolene.

Cormack & Annand, Tenth Street, New Westminster.
Easthope Brothers, 1729 Georgia Street, Vancouver.
Hafer Machine Works, Victoria.
Hall Machine Works, Vancouver.
Heaps Engineering Company, Ltd., New Westminster.
Ideal Iron Works, Ltd., 123 Powell Street, Vancouver.
Marine Iron Works, Victoria.
Pacific Standard Motor Works, Vancouver.
Pumps & Power, Ltd., 224 Abbott Street, Vancouver.
Schaake Company, Ltd., Granville Island, Vancouver.
Vivian Gas Engine Works, 1090 Sixth Avenue West, Vancouver.
Wonder Pump & Engine Co., 931 Pender Street West, Vancouver.

Envelopes.

Pioneer Envelopes, Ltd., Vancouver.

Explosives.

Canadian Explosives, Ltd., Vancouver.
Giant Powder Company of Canada. Ltd., Victoria.
Sabulite Explosives, Ltd., Port Coquitlam.

Extracts, Flavouring.

Empress Manufacturing Company, Ltd., 1106 Homer Street, Vancouver. "Empress"; "Climax."
Fruitall Company, Ltd., Vancouver.
Jameson Coffee Company, W. A., 754 Broughton Street, Victoria. "Jameson."
Kelly, Douglas & Company, Vancouver. "Nabob."
Malkin & Company, Ltd., W. H., Vancouver. "Malkin's Best"; "Tropical"; "Victoria Cross."

Feed.

Brackman-Ker Milling Company, Ltd., Victoria.
Easterbrook Milling Company, Eburne.
McLellan & McCarter, Ltd., 1605 Sixth Avenue West, Vancouver.
Vancouver Milling & Grain Company, Ltd., Vancouver.
Vernon & Buckerfield, 321 Front Street, Vancouver.
Victory Flour Mills, Ltd., 806 Beach Avenue, Vancouver.

Felts, Dry.

Sidney Roofing & Paper Company, Ltd., Victoria.

Felts, Saturated.

Pacific Roofing Company, Ltd., Granville Island, Vancouver.
Sidney Roofing & Paper Company, Ltd., Victoria.

FENCES AND GATES.

Artistic Iron Works, 116 Dufferin Street East, Vancouver.
B.C. Anchor Fence Company, Ltd., 1031 Pender Street West, Vancouver.
Pearson Wire & Iron Company, City Market, Vancouver.
Westminster Iron Works, Ltd., New Westminster.

FENCE-WIRE.

B.C. Anchor Fence Company, Ltd., 1031 Pender Street West, Vancouver.
Morrison Steel & Wire Company, Granville Island, Vancouver.
Watt Company, Ltd., Thomas, 225 Fifth Avenue West, Vancouver.

FERTILIZER.

B.C. Fertilizer, 832 Hereward Road, Victoria.
Beaty & Company, W. R., Granville Island, Vancouver.
Globe Fertilizer Company, foot of Campbell Street, Vancouver.
Henshall Fish Products, Ltd., Sooke.
Herondale Farm, Ltd., 1571 Pender Street West, Vancouver.
Pacific Guano Company, Ltd., 433 Pender Street West, Vancouver.
Rendezvous Fisheries, Ltd., Rendezvous Island.
Triangle Chemical Company, New Westminster.
Vancouver Island Whaling Company, Ltd., Victoria.
Victoria Chemical Company, Victoria.

FISH-MEAL.

Beaty & Company, W. R., Granville Island, Vancouver.
Henshall Fish Products, Ltd., Victoria.
Nanaimo Fish Meal & Oil Refinery, Nanaimo.
Pacific Guano Company, 433 Pender Street West, Vancouver.
Rendezvous Fisheries, Ltd., Rendezvous Island.

FISH-OIL.

Beaty & Company, W. R., Granville Island, Vancouver.
Canada Fish Products, Ltd., Ladner.
Consolidated Whaling Corporation, Ltd., Victoria.
Henshall Fish Products, Ltd., Victoria.
Nanaimo Fish Meal & Oil Refinery, Nanaimo.
Pacific Guano Company, 433 Pender Street West, Vancouver.
Rendezvous Fisheries, Ltd., Rendezvous Island.

FISH, PICKLED.

B.C. Fishing & Packing Company, Ltd., Vancouver.
Gosse-Millerd Company, Vancouver.
Watson Brothers, Vancouver.
Wallace Fisheries, Ltd., Vancouver.

FISH, SMOKED.

Atlin Fisheries, Ltd., Prince Rupert.
Butterfield-Mackie Company, Ltd., Vancouver. "B. & M."
Canadian Fish & Cold Storage Company, Ltd., Prince Rupert.
Pacific Coast Fish & Oyster Company, Ltd., foot of Gore Avenue, Vancouver. "Pacific."
Watson Brothers Fishing & Packing Company, Ltd., Vancouver. "Watson's."

FISHING-SPOONS.

Clendon Tool & Stamping Works, 135 Hastings Street West, Vancouver.
Gibs Tool & Stamping Works, 356 Dufferin Street West, Vancouver.
Lenfesty, W. N., 1324 Government Street, Victoria.

Fittings, Wood (Bank, Office, and Store).

Canadian Western Woodworkers, Ltd., Garbally Road, Victoria.
Chrystall & Company, Ltd., E. C., 108 Georgia Street East, Vancouver.
Johnson & Allen, 148 Lorne Street East, Vancouver.
Marston, C., Cabinet Works, 3764 Commercial Drive, Vancouver.
McLeod Sash & Door Factory, Ltd., 1251 Charles Street, Vancouver.
Dixon & Murray, Dunsmuir Street, Vancouver.

Flags and Bunting.

Grant-Holden-Graham, Ltd., Vancouver.
Jeune, F., & Bro., Ltd., Victoria.
Jones & Son, Ltd., C. H., 28 Water Street, Vancouver.

Flooring, Hardwood.

B.C. Hardwood Floor Company, Ltd., Vancouver and Victoria.
Fyfe-Smith & Company, J., Vancouver.
Inlay Hardwood Floor Company, 929 Pender Street West, Vancouver.

Flour.

Brackman-Ker Milling Company, Ltd., Victoria. "B. and K."
Easterbrook Milling Company, Ltd., Eburne. "Imperial."
Okanagan Farmers' Milling Company, Ltd., Vernon.
Soda Creek Roller Mills, Soda Creek.
Vancouver Milling & Grain Company, Ltd., Vancouver. "Wild Rose"; "Royal Standard."
Vernon & Buckerfield, 321 Front Street, Vancouver.
Victory Flour Mills, Ltd., 806 Beach Street, Vancouver. "Velvet"; "Paragon."

Fluff Rugs.

Pacific Coast Fluff Rug Company, 1061 Richards Street, Vancouver.
Vancouver Fluff Rug Company, Seventeenth Avenue West and Willow Street, Vancouver.

Foundries.

Boundary Iron Works, Ltd., Grand Forks.
Canadian Sumner Iron Works, 1214 Pender Street East, Vancouver.
Hendry Foundry Company, 360 Front Street West, Vancouver.
Letson & Burpee, Ltd., Vancouver.
Mainland Engineering Company, Ltd., 422 Railway Street, Vancouver.
Marine Iron Works, Pembroke Street, Victoria.
McLean & Powell, Vancouver.
Nanaimo Foundry, Nanaimo.
Nelson Iron Works, Ltd., Nelson.
Pacific Iron Works, 231 Prior Street, Vancouver.
Progressive Engineering Works, 900 Powell Street, Vancouver.
Ramsay & Adams Foundry Company, Garbally Road, Victoria.
Ross & Howard Iron Works, foot of Woodland Drive, Vancouver.
Schaake Company, Ltd., Granville Island, Vancouver.
Star Brass Foundry Company, Lorne and Columbia Streets, Vancouver.
Sumner Brass Works, 610 Bidwell Street, Vancouver.
Tait Pipe & Foundry Company, Vancouver.
Terminal City Iron Works, 1949 Albert Street, Vancouver.
Vancouver Brass Works, 1304 Keefer Street, Vancouver.
Vancouver Engineering Works, Ltd., 519 Sixth Avenue West, Vancouver.
Victoria Brass & Iron Works, Esquimalt.
Vulcan Iron Works, Ltd., Granville Island, Vancouver.
Wallace Foundry Company, Granville Island, Vancouver.
Westminster Foundry Company, New Westminster.

FRUITS, CANNED.

Broder Canning Company, Ltd., New Westminster. "Fraser Valley Brand"; "Royal City Brand."
Dominion Canners of B.C., Ltd., 332 Drake Street, Vancouver. "Quaker."
Kamloops Canneries, Ltd., Kamloops.
King-Beach Manufacturing Company, Ltd., Mission.
Keremeos Packing Company, Ltd., Keremeos. "Diamond K. Brand."
Occidental Fruit Company, Ltd., Kelowna. "Okanagan Brand."
Okanagan Canning Company, Kelowna. "Duncan's Best."
O.U.G. Fruit Products, Ltd., Vernon. "O.K."
Saanich Canning Company, Sidney. "Saanich Brand."
Victoria Preserving & Canning Company, 741 Johnson Street, Victoria.

FURNACES.

Albion Stove Works, Victoria.
Ralph, William, Ltd., 626 Seymour Street, Vancouver.
Vancouver Stove & Heater Works, Ltd., 2100 Eleventh Avenue West, Vancouver.

FURNITURE.

Bennett & Son, Thomas, 1256 Union Street, Vancouver.
Dowling Manufacturing Company, 266 Dufferin Street East, Vancouver.
Fine Arts Furniture Company, Ltd., 1115 Pender Street West, Vancouver.
Hardwood Chair Company, Ltd., 860 Hornby Street, Vancouver.
Morlock Company, Ltd., 1052 Homer Street, Vancouver.
Province Furniture Manufacturing Company, Ltd., foot of Victoria Drive, Vancouver.
Restmore Manufacturing Company, Ltd., Vancouver.
Weiler Brothers, Ltd., 921 Government Street, Victoria.
Westminster Furniture Manufacturing Company, New Westminster.

FURNITURE, PERIOD DESIGN.

Fine Arts Furniture Company, Ltd., 1115 Pender Street West, Vancouver.
Johnson, H. L., Fort Street, Victoria.
Timewell, D. C., Ltd., 1123 Granville Street, Vancouver.

FURNITURE, WILLOW.

Wakefield, E. J., 56 Dufferin Street West, Vancouver.

GAS, CARBONIC ACID.

Canadian Carbonate, Ltd., Eleventh Avenue and Yew Street, Vancouver.

GAS, ILLUMINATING.

City of Nelson Gas Company, Ltd., Nelson.
Granby Consolidated Mining, Smelting & Power Company, Vancouver.
New Westminster Gas Works, New Westminster.
Vancouver Gas Company, Ltd., Vancouver.
Victoria Gas Company, Ltd., Victoria.

GASOLENE.

Imperial Oil, Ltd., Ioco.
Union Oil Company, Port Moody.

GLASS-BLOWER.

Lang Electric Company, Vancouver.

Gloves, Leather.

Howard Glove Company, Vancouver.
Sandell Manufacturing Company, Ltd., 336 Cordova Street West, Vancouver.
Vancouver Glove Company, 223 Carrall Street, Vancouver.
Watson, John, 127 Dufferin Street East, Vancouver.

Glycerine.

Pendray & Sons, W. J., Ltd., Victoria.
Royal Crown Soaps, Ltd., 308 Georgia Street East, Vancouver.

Halibut.

Clayoquot Canning Company, Ltd., Clayoquot.
N.M. & R. Fish Company, Ltd., Prince Rupert.
Royal Fish Company, Prince Rupert.

Hand Cleaners.

Canadian Chemical Company, Vancouver.

Handles, Axe, Broom, Mop, etc.

B.C. Handle Company, Ltd., Vancouver.
Vancouver Handle Company, Ltd., Vancouver.
J. N. Young Company, Marine Drive and Manitoba Street, South Vancouver.

Harness.

Beer, A. J., West Summerland.
B.C. Saddlery Company, Ltd., Victoria.
Bryant, C. F., Nanaimo.
Duncan, William, Victoria.
Ferris, Walter, 1514 Fifth Avenue West, Vancouver.
Norris & Sons, F., Victoria.
McLaren, D. C., 211 Georgia Street East, Vancouver.
Okanagan Saddlery, Vernon.
Storey & Campbell, 518 Beatty Street, Vancouver.
Wilcox-Hall Company, Ltd., Kamloops.
S. Nelson Company, Ltd., Vancouver.

Hat-manufacturers.

Caledonian Hat Works, 135 Hastings Street West, Vancouver.
Linforth's Hat Manufacturing Company, 344 Abbott Street, Vancouver.
Pacific Hat & Pennant Factory, 669 Smythe Street, Vancouver.
Paris Hat Company, 307 Cordova Street West, Vancouver.
Victoria Hat Factory, Fort and Broad Streets, Victoria.
Western Hat & Frame Company, 508 Smythe Street, Vancouver.
Wilcox Hat Company, Ltd., 719–723 Courtenay Street, Victoria.

Heaters, Air-tight.

Albion Stove Works, Victoria.
Domestic Air Heater Company, Victoria.
McLean & Powell Iron Works, Dufferin Street, Vancouver.
McClary Manufacturing Company, Ltd., Vancouver.
Vancouver Stove & Heater Company, Ltd., 2100 Eleventh Avenue West, Vancouver.

Herring.

Canadian Fishing Company, Ltd., foot of Gore Avenue, Vancouver.
N.M. & R. Fish Company, Prince Rupert.

HERRING, DRY-SALTED.

Barclay Sound Fisheries, Ltd., Sarita Bay, Barclay Sound.
Maritime Fisheries, Ltd., Vancouver.
Watson Brothers Fishing & Packing Company, Ltd., Vancouver.

HOPS.

Agassiz Hop Company, Agassiz.
British Columbia Hop Company, Ltd., Vancouver.
Chilliwack Hop Company, Chilliwack.

HOUSES, READY-CUT.

Cut-to-fit Buildings Company, Ltd., Vancouver.
Fabricated Buildings Company, Ltd., Davis Chambers, Vancouver.
Great West Manufacturing Company, Ltd., foot of Commercial Drive, Vancouver.
Mill Cut Homes & Lumber, Ltd., 2606 Yew Street, Vancouver.

ICE, ARTIFICIAL.

Amiel, A. L., 1027 Main Street, Vancouver.
Casorso Brothers, Ltd., Kelowna.
Eburne Ice Company, 8866 Hudson Street, Vancouver.
Harwood, Joseph, Vernon.
Ice Delivery Company, Ltd., Homer and Smythe Streets, Vancouver.
Kaslo Transfer Company, Kaslo.
Kootenay Ice Company, Nelson.
Mainland Ice & Cold Storage Company, Nelson Street, Vancouver.
Penticton Ice & Cold Storage Company, Penticton.
St. Mungo Canning Company, Ltd., New Westminster.
Vancouver Ice & Cold Storage Company, Ltd., 11 Gore Avenue, Vancouver.
Vancouver Island Fish & Cold Storage Company, Nanaimo.
Victoria Ice Company, 2626 Rose Street, Victoria.
Westminster Ice & Creamery Company, Ltd., New Westminster.
Wilson, B., Company, Ltd., 536 Herald Street, Victoria.

ICE-CREAM.

Almonds, Ltd., 440 Pender Street East, Vancouver.
Clarke, F. S., Nanaimo.
Comox Creamery Association, Courtenay.
Crescent Ice Cream Company, 1002 Hastings Street West, Vancouver.
Curlew Creamery Company, Grand Forks.
Curlew Creamery Company, Nelson.
Fraser Valley Dairy, 1170 Hornby Street, Vancouver.
Kelowna Creamery Company, Ltd., Kelowna.
Northern Okanagan Creamery Association, Armstrong.
Northwestern Creamery, Ltd., Victoria.
Royal Dairy, 1001 Pender Street, Vancouver.
Royal Dairy, Douglas Street, Victoria.
Spencer, David, Ltd., Vancouver.
Terry, W. S., Fort Street, Victoria.
Victoria City Dairy Company, Ltd., 1111 Fort Street, Victoria.
White Lunch, Ltd., 123 Hastings Street West, Vancouver.

INCUBATORS AND BROODERS.

Canadian Queen Manufacturing Company, Ltd., foot of Smythe Street, Vancouver.
" 'Canadian Queen."
Vancouver Incubator Company, Vancouver.

Ink, Printing.

Columbia Printing Ink & Roller Company, 1063 Hamilton Street, Vancouver.

Ink, Writing.

Peerless Products, Ltd., 1642 Pandora Street, Vancouver. "Peerless."
Walmsley, Frank, 1578 Fifth Avenue West, Vancouver.

Iodine.

Nichols Chemical Company of Canada, Ltd., Barnet.

Jams and Jellies.

Broder Canning Company, Ltd., New Westminster. "Fraser Valley"; "Royal City."
Dominion Canners, B.C., Ltd., Vancouver. "Quaker"; "Totem."
Empress Manufacturing Company, Ltd., 1106 Homer Street, Vancouver. "Empress"; "Climax."
King-Beach Manufacturing Company, Ltd., Mission. "K-B."
Laurel Canners, Ltd., Lake Hill.
Mission Preserving Company, Mission. "Apex."
McDonald Jam Company, Ltd., Nelson. "Nelson."
O.U.G. Fruit Products, Ltd., Vernon. "O.K."
Pound, Mrs. George, 621 Fifteenth Avenue East, Vancouver. "Mrs. Pound's."
Victoria Preserving & Canning Company, Ltd., 741 Johnson Street, Victoria. "Cooper's."

Jerseys.

Maple Leaf Knitting Company, 135 Hastings Street West, Vancouver.
Pride of the West Knitting Mills, Ltd., 500 Beatty Street, Vancouver. "Pride of the West."
Quigley Knitting Mills, Ltd., 78 Dufferin Street East, Vancouver. "Q."
Universal Knitting Company, Ltd., 303 Pender Street West, Vancouver. "Universal."

Jewellers, Manufacturing.

Allan, O. B., Granville Street, Vancouver.
Birks & Sons, Ltd., Henry, Granville Street, Vancouver.
Flewwelling, E. R., 18 Hastings Street West, Vancouver.
Jacoby Brothers, 423 Hamilton Street, Vancouver.
Little & Taylor, 617 Fort Street, Victoria.
Mitchell & Duncan, 624 View Street, Victoria.
Peetz, B. C., 654 Yates Street, Victoria.
Trayling & Waters, 326 Hastings Street West, Vancouver.

Knitted Goods, Woollen.

Maple Leaf Knitting Company, 135 Hastings Street West, Vancouver.
Pride of the West Knitting Mills, Ltd., 500 Beatty Street, Vancouver. "Pride of the West."
Quigley Knitting Mills, Ltd., 78 Dufferin Street East, Vancouver. "Q."
Universal Knitting Company, 303 Pender Street West, Vancouver. "Universal."

Knives, Planer, etc.

Dion Knife Company, 848 Cambie Street, Vancouver.

Lace, Hand-made.

Dall Real Lace Company, 615 Granville Street, Vancouver.
Thompson Lace & Veiling Company, 543 Granville Street, Vancouver.

Laces, Leather.

Nelson, S., Company, Vancouver.

LADDERS.

Allright Ladder Company, 912 Richards Street, Vancouver.
Canadian Queen Manufacturing Company, Ltd., foot of Smythe Street, Vancouver.
Hiker Manufacturing Company, Esquimalt Road and Williams Street, Victoria.
Jones' Chicken House & Ladder Factory, 827 Fort Street, Victoria.
Waters & Company, Ltd., T. H., Nelson.

LAMPS, AUTOMOBILE.

Auto Radiator & Lamp Company, 551 Seymour Street, Vancouver.

LARD.

Burns, P., & Company, Ltd., Victoria and Vancouver. "Shamrock."
Swift Canadian, Ltd., Victoria and Vancouver. "Silver Leaf."

LEATHER BAGS, CASES, TRUNKS, ETC.

B.C. Saddlery Company, Ltd., Victoria.
B.C. Leather & Findings Company, 119 Pender Street West, Vancouver.
Burns, J. F., 519 Granville Street, Vancouver.
Duncan, William, Douglas Street, Victoria.
Imperial Trunk & Leather Goods, Ltd., 338 Hastings Street West, Vancouver.
Norris & Son, F., Government Street, Victoria.
Storey & Campbell, 518 Beatty Street, Vancouver.
Vancouver Trunk & Bag Company, Ltd., 1424 Charles Street, Vancouver.

LEATHER, UPPER AND SOLE.

Leckie, J., & Company, Ltd., New Westminster.
Nelson, S., Company, Ltd., Vancouver.

LIMBS, ARTIFICIAL.

Lundberg, A., Company, 938 Pender Street West, Vancouver.

LIME.

Alunite Mining & Products Company, Ltd., 912 Vancouver Block, Vancouver.
Hazel, E. J., Crowsnest.
Lands Lime, Ltd., Armstrong.
Northwest Supplies, Ltd., 525 Sayward Building, Victoria.
Pacific Lime Company, Ltd., 313 Pacific Building, Vancouver.
Rosebank Lime Company, Ltd., 415 Pemberton Building, Victoria.
Summit Lime & Cooperage Works, Crowsnest.
Western Canada Lime Company, Popkum.

LINES, CLOTHES.

Canada Western Cordage Company, Ltd., New Westminster.

LINGERIE.

Dall Lace Company, Ltd., 615 Granville Street, Vancouver.
Vanity Waist & Neckwear Company, Ltd., 136 Water Street, Vancouver.
Thomson, James, & Son, Ltd., Water Street, Vancouver.

LIQUID AIR.

Compressed Gas Company, 1530 Hastings Street West, Vancouver.
L'Air Liquide Society, Yukon and Fifth Avenue, Vancouver.
Tupper & Steele, Ltd., 1669 Third Avenue West, Vancouver.

LOCOMOTIVES, GASOLENE.

Westminster Iron Works, Ltd., New Westminster.

Lye.

Pendray, W. J., & Sons, Ltd., Victoria.
Royal Crown Soap Works, 308 Georgia Street East, Vancouver.

Macaroni.

Kelly-Douglas Company, Ltd., Vancouver. "Canadian."
Kelly Confection Company, Ltd., 1106 Mainland Avenue, Vancouver.
Modern Macaroni Factory, 638 Cormorant Street, Victoria. "Liberty Brand."
Ramsay Brothers & Company, Ltd., 990 Powell Street, Vancouver. "Ramsay's."

Machinery, Canning.

Heaps Engineering Company, Ltd., New Westminster.
Letson & Burpee, Ltd., Vancouver.
Schaake Company, Ltd., Vancouver.
Victoria Machinery Depot Company, Ltd., Victoria.
Murray-Latta Machine Works, Vancouver.

Machinery, Ice-making.

Linde Refrigerator Company, Vancouver.
Mitchell, George E., Vancouver.

Machinery, Logging.

Canadian Sumner Iron Works, Vancouver.
Empire Manufacturing Company, Ltd., 1200 Sixth Avenue West, Vancouver.
Gibson's, Ltd., 1 Alexander Street, Vancouver.
Hall Machine Works, 1225 Alberni Street, Vancouver.
Heaps Engineering Works, New Westminster.
Letson & Burpee, Vancouver.
Mainland Engineering Works, Vancouver.
Marine Iron Works, Victoria.
M. O. Olsen Iron Works, 309 Alexander Street, Vancouver.
Opsal Steel Company, Ltd., Vancouver.
Pacific Iron Works, 241 Prior Street, Vancouver.
Progressive Engineering Works, Vancouver.
Ross & Howard Iron Works, Ltd., Vancouver.
Terminal City Iron Works, Vancouver.
Vancouver Engineering Works, Vancouver.
Vancouver Machinery Depot, Vancouver.
Victoria Machinery Depot, Victoria.
Westminster Iron Works, New Westminster.
Yarrows, Ltd., Esquimalt.

Machinery, Mining.

Boundary Iron Works, Ltd., Grand Forks.
Ellis & Company, W. J., Kamloops.
Heaps Engineering Company, New Westminster.
Marine Iron Works, Victoria.
Nelson Iron Works, Ltd., Nelson.
Ross & Howard Iron Works, Ltd., Vancouver.
Terminal City Iron Works, Vancouver.
Vancouver Engineering Works, Ltd., Vancouver.
Victoria Machinery Depot, Victoria.
Vulcan Iron Works, Ltd., Granville Island, Vancouver.

Machinery, Pulp-wood and Pulp.

Ross & Howard Iron Works, Ltd., Vancouver.
Vancouver Engineering Works, Ltd., Vancouver.
Vulcan Iron Works, Ltd., Granville Island, Vancouver.

MACHINERY, SAWMILL AND SHINGLE-MILL.

B.C. Equipment Company, Ltd., Vancouver.
Canadian Sumner Iron Works, Ltd., 1214 Pender Street East, Vancouver.
Ellis & Company, W. J., Kamloops.
Hall Machine Works, 1225 Alberni Street, Vancouver.
Heaps Engineering Company, Ltd., New Westminster.
Letson & Burpee, Ltd., Vancouver.
Nelson Iron Works, Ltd., Nelson.
Ross & Howard Iron Works Company, Ltd., Vancouver.
Schaake Company, Ltd., Vancouver.
Victoria Machinery Depot Company, Ltd., Victoria.
Vancouver Machinery Depot, Vancouver.

MACHINERY, SMELTING.

Boundary Iron Works, Ltd., Grand Forks.
Nelson Iron Works, Ltd., Nelson.
Ross & Howard Iron Works, Ltd., foot of Woodland Drive, Vancouver.
Vancouver Engineering Works, Ltd., 519 Sixth Avenue West, Vancouver.

MACHINES, WASHING.

Beatty Brothers, Ltd., 928 Granville Street, Vancouver.
Golightly Brothers, Ltd., 753 Powell Street, Vancouver.

MAGNESITE, CALCINED.

Pacific Roofing Company, Ltd., Vancouver.

MARMALADE.

Empress Manufacturing Company, Ltd., 1106 Homer Street, Vancouver. "Empress"; "Climax."
Mrs. Haine, Ltd., 2645 Fourth Avenue West, Vancouver. "Mrs. Haine's."
Mrs. Geo. Pound, Vancouver. "Mrs. Pound's."
King-Beach Manufacturing Company, Ltd., Mission. "K-B."
Laurel Canners, Ltd., Lake Hill.
McDonald Jam Company, Ltd., Nelson. "Victory."
Stanley's Pure Preserve Company, 3370 Victory Street, Vancouver.
Victoria Preserving Company, Ltd., 731 Johnson Street, Victoria. "Cooper's."

MATTRESSES.

Heberlee Ideal Bedding Company, Ltd., 159 Granville Street, Vancouver.
Restmore Manufacturing Company, Ltd., Vancouver. "Restmore."
Simmons, Ltd., 2034 Eleventh Avenue West, Vancouver. "Simmons."
Victoria Bed & Mattress Company, Ltd., 776 Topaz Avenue, Victoria. "Getmorerest."
Kootenay Wire Works Manufacturing Company, Ltd., Nelson.
Folding Mattress Company, 300 Glen Drive, Vancouver. "Modern."

MEAL, FISH.

Beaty Company, W. R., Granville Island, Vancouver.
Henshall Fish Products, Ltd., Victoria.
Nanaimo Fish Meal & Oil Refinery, Nanaimo.
Pacific Guano Company, 433 Pender Street West, Vancouver.
Rendezvous Fisheries, Ltd., Rendezvous Island.

MEATS, CURED.

P. Burns & Company, Ltd., Vancouver and Victoria.
Swift Canadian, Ltd., Vancouver and Victoria.

Milk, Evaporated.

Pacific Milk Company, Ltd., 328 Drake Street, Vancouver. "Pacific."

Mince-meat.

P. Burns & Company, Ltd., Vancouver.
Empress Manufacturing Company, Ltd., 1106 Homer Street, Vancouver. "Empress"; "Climax."
Kelly Confection Company, Ltd., 1106 Mainland Street, Vancouver. "Kelly's."

Mirrors.

Bogardus-Wickens, Ltd., 1000 Homer Street, Vancouver.
O'Neil Company, Ltd., Wm. N., Victoria and Vancouver.
Pilkington Brothers, Vancouver.
Wm. Holt & Sons, 436 Dufferin Street West, Vancouver.

Molasses.

B.C. Sugar Refinery, Vancouver.
Kelly Confection Company, Ltd., 1106 Mainland Street, Vancouver. "Chef"; "Sugar House"; "Black Strap."
Ramsay Brothers & Company, Ltd., Vancouver. "D."

Mops.

Dust Control Company, 2246 Commercial Drive, Vancouver. "Cedar"; "Roylo."

Mucilage.

Columbia Printing Ink & Roller Company, Vancouver.
Peerless Products, Ltd., 1642 Pandora Street, Vancouver. "Peerless."

Nails.

Morrison Steel & Wire Company, Ltd., Granville Island, Vancouver.

Naphtha.

Granby Consolidated Mining & Smelting Company, Vancouver.

Neckwear, Men's.

Cravat & Regalia Company, 436 Howe Street, Vancouver.
Kerr Manufacturing Company, Vancouver. "Kerr."

Neckwear, Women's.

Finlayson, H. L., 318 Homer Street, Vancouver.
Vanity Waist & Neckwear Company, Ltd., 136 Water Street, Vancouver.

Oils, Burning.

Imperial Oil Company, Ltd., Ioco.
Union Oil Company, Port Moody.

Oils, Creosote.

Barrett Company, Ltd., Marpole.
Republic Creosoting Company, Vancouver.
Western Industrial Development Company, 1043 Hamilton Street, Vancouver.

Oil, Fish.

Beaty & Company, W. R., Granville Island, Vancouver.
Canada Fish Products, Ltd., Ladner.
Consolidated Whaling Corporation, Ltd., Victoria.
Henshall Fish Products, Ltd., Victoria.
Nanaimo Fish Meal & Oil Refinery, Nanaimo.
Pacific Guano Company, 433 Pender Street West, Vancouver.
Rendezvous Fisheries, Ltd., Rendezvous Island.

OIL, FLOOR.

British American Paint Company, Ltd., Victoria.
Dust Control Company, 2246 Commercial Drive, Vancouver.
Tillikum Manufacturing Company, Dufferin Street West, Vancouver.
Western Industrial Development Company, 1043 Hamilton Street, Vancouver.

OIL, FUEL.

Imperial Oil, Ltd., Ioco.
Union Oil Company, Port Moody.

OIL, GAS DISTILLATE.

Western Industrial Development Company, 1043 Hamilton Street, Vancouver.
Imperial Oil, Ltd., Ioco.
Sidney Roofing & Paper Company, Ltd., Victoria.
Union Oil Company, Port Moody.

OIL, LUBRICATING.

Ayres Varnish Company, Ltd., Vancouver.
Western Industrial Development Company, 1043 Hamilton Street, Vancouver.
Imperial Oil, Ltd., Ioco.
Union Oil Company, Port Moody.

OIL, POLISHING.

British American Paint Company, Ltd., Victoria.
Suprema Polish Company, 2071 First Avenue West, Vancouver.
Western Industrial Development Company, 1043 Hamilton Street, Vancouver.

OIL, WHALE.

Consolidated Whaling Corporation, Ltd., Victoria.

ORNAMENTAL-IRON WORKS.

Artistic Iron Works, 116 Dufferin Street East, Vancouver.
Morris & Company, S. M., 2120 Cedar Street, Vancouver.
Pearson Wire & Iron Works, City Market, Vancouver.
Westminster Iron Works, New Westminster.

OVERALLS.

Gault Brothers, Ltd., 361 Water Street, Vancouver. "Caribou"; "Bull Dog"; "Canuck."
Thomson & Sons, Ltd., James, 353 Water Street, Vancouver. "Twin Bute."
Turner, Beeton & Company, Ltd., Victoria. "Big Horn."

OXYGEN.

Compressed Gas Company, Ltd., 1530 Hastings Street East, Vancouver.
L'Air Liquide Society, Fifth Avenue and Yukon Street, Vancouver.

PAINTS.

Ayres Varnish & Paint Company, Ltd., Raymur & Parker Streets, Vancouver.
Brandram-Henderson, Ltd., 470 Granville Street, Vancouver.
British American Paint Company, Ltd., Victoria.
Crown Paint Company, Ltd., 24 Cordova Street East, Vancouver.
Darling & Son, Henry, 28 Powell Street, Vancouver.
Martin-Senour Company, Ltd., 1505 Powell Street, Vancouver.
National Paint Company, Ltd., Granville Island, Vancouver.
Pacific White Lead Company, Ltd., Granville Island, Vancouver.
Sherwin-Williams Company of Canada, Ltd., Vancouver.
Staneland Company, Ltd., Fort Street, Victoria.
Williams, Stanner & Harte, Ltd., 1302 Wharf Street, Victoria.

Paper, Building.

Barrett Company, Ltd., Tenth Avenue and Arbutus Street, Vancouver. "Victoria"; "Western"; "Anchor"; "Stag."
Sidney Roofing & Paper Company, Ltd., Victoria. "Kraft"; "Capital"; "Esquimalt."

Paper, Kraft.

Pacific Mills, Ltd., Ocean Falls.

Paper, Newsprint.

Pacific Mills, Ltd., Ocean Falls.
Powell River Company, Ltd., Powell River.

Paste, Label.

Columbia Printing Ink & Roller Company, 1063 Hamilton Street, Vancouver.
Laboratories & Manufacturing Company, Cordova and Cambie Streets, Vancouver.
Peerless Products, Ltd., 1642 Pandora Street, Vancouver.

Paste, Photo.

Peerless Products, Ltd., 1642 Pandora Street, Vancouver. "Peerless."

Peanut Butter.

Canada Nut Company, Ltd., 1280 Homer Street, Vancouver. "Nutro."
Kelly Confection Company, Ltd., 1106 Mainland Street, Vancouver.
Lyons & Company, F., 1500 Main Street, Vancouver.
McQueen Produce Company, Ltd., 25 Pender Street West, Vancouver.

Peel, Candied.

Robinson, W., 3636 Fourth Avenue West, Vancouver.

Phonographs.

Artcraft Phonograph Company, Vancouver. "Classic."
Premier Phonograph Company, Garbally Road, Victoria. "Premier."

Pianos.

Edward Charles, New Westminster.

Pickles.

Empress Manufacturing Company, 1106 Homer Street, Vancouver. "Empress"; "Climax."
Lyons & Company, F., 1500 Main Street, Vancouver.
Vancouver Pickle Company, Ltd., Granville Island, Vancouver. "Rainbow."
Western Pickling Works, Ltd., View Street, Victoria. "Camosun."

Pilchards.

Nootka Packing Company, Ltd., Nootka.
Wallace Fisheries, Ltd., Vancouver.

Pillows.

Heberlee's Ideal Bedding Company, 1159 Granville Street, Vancouver. "Ideal."
Restmore Manufacturing Company, Vancouver.
Simmons, Ltd., 2034 Eleventh Avenue West, Vancouver. "Ostermore"; "Ostermoor."

Pipe, Cast Iron.

McLean & Powell, Vancouver.
Ross & Howard Iron Works, Ltd., Vancouver.
Tait Pipe & Foundry Company, Ltd., 500 Beatty Street, Vancouver.
Vancouver Engineering Works, Vancouver.

PIPE, WOOD STAVE.

Canadian Pipe Company, Ltd., 550 Pacific Street, Vancouver.
Pacific Coast Pipe Company, Ltd., 1551 Granville Street, Vancouver.
Vancouver Wood Pipe & Tank Company, 850 Hastings Street West, Vancouver.

PISTON-RINGS.

Beatson, Frank, Granville Island, Vancouver.

PITCH.

Barrett Company, Ltd., Tenth Avenue and Arbutus Street, Vancouver.

PLATING.

Albion Stove Works, Victoria.
B.C. Silver Plating Company, 547 Richards Street, Vancouver.
Cascade Plating Works, 325 Howe Street, Vancouver.
Superior Plating & Galvanizing Works, 153 Cordova Street East, Vancouver.
Victoria Plating Works, 823 Pandora Street, Victoria.

POLISH, AUTO.

Golden Rule Manufacturing Company, 622 Campbell Street East, Burnaby.

POLISH, BOOT AND SHOE.

Tillikum Manufacturing Company, Vancouver.

POLISH, FLOOR, FURNITURE, ETC.

British American Paint Company, Ltd., Victoria.
Western Industrial Development Company, 1043 Hamilton Street, Vancouver.
Dust Control Company, 2246 Commercial Drive, Vancouver.
Suprema Polish Co., 2071 First Avenue West, Vancouver.
Tillikum Manufacturing Company, Vancouver.

POLISH, SILVER AND METAL.

British American Paint Company, Ltd., Victoria.
Brighten All, Victoria.

POLISH, STOVE.

Canadian Chemical Company, Ltd., 376 Lansdowne Street West, Vancouver. "Stove Tox."
Tillikum Manufacturing Company, Vancouver. "Skookum."

PORK AND BEANS.

Broder Canning Company, Ltd., New Westminster. "Fraser Valley"; "Royal City."
Dominion Canners, B.C., Limited, 332 Drake Street, Vancouver. "Quaker."

POWDER, BAKING.

Empress Manufacturing Company, Ltd., 1106 Homer Street, Vancouver. "Empress"; "Climax."
Jameson, W. A., Coffee Company, 754 Broughton Street, Victoria. "Featherlight."
Kelly, Douglas & Company, Ltd., Vancouver. "Nabob."
Malkin & Company, Ltd., W. H., Vancouver. "Malkin's Best"; "Tropical"; "Victoria Cross."

POWDER, BLASTING.

Canadian Explosives, Ltd., Vancouver.
Giant Powder Company of Canada, Ltd., Victoria.
Sabulite Explosives, Ltd., Port Coquitlam.

POWDER, FACE.

Henrietta Toilet Preparations, 649 Seymour Street, Vancouver. "Henrietta."

Powder, Jelly.

Empress Manufacturing Company, Ltd., 1106 Homer Street, Vancouver. "Empress"; "Climax."
Jameson, W. A., Coffee Company, Broughton Street, Victoria. "Jameson's."
Kelly, Douglas & Company, Ltd., Vancouver. "Nabob."
Malkin Company, Ltd., W. H., Vancouver. "Malkin's Best."

Powder, Talcum.

B.C. Pharmacal Company, Ltd., Railway Street, Vancouver. "Columbian Violet"; "Canadian Bouquet"; "Perfect."
Henrietta Toilet Preparations, 649 Seymour Street, Vancouver. "Henrietta."

Powder, Washing.

Golden Rule Manufacturing Company, 622 Campbell Avenue, East Burnaby. "Golden Rule."
Pendray & Sons, Ltd., W. J., Victoria. "White Swan."
Radio Manufacturing Company, Vancouver.
Royal Crown Soaps, Ltd., 308 Georgia Street East, Vancouver. "Royal Crown."
Woodley Manufacturing Company, Vancouver.

Pulleys, Wood.

Columbia Pulleys, Ltd., 624 Eighteenth Avenue East, Vancouver.
Letson & Burpee, Ltd., 172 Alexander Street, Vancouver.

Pulp, Kraft.

Pacific Mills, Ltd., Ocean Falls.
Western Canada Pulp & Paper Company, Ltd., Port Mellon.

Pulp, Sulphate Wood.

Beaver Cove Lumber & Pulp Company, Ltd., Beaver Cove.
Pacific Mills, Ltd., Ocean Falls.
Western Canada Pulp & Paper Company, Ltd., Port Mellon.

Pulp, Sulphite Wood.

Whalen Pulp & Paper Mills, Ltd., Vancouver.

Pumps.

Letson & Burpee, Vancouver.
Marine Iron Works, Victoria.
Pumps & Power, Ltd., Vancouver.
Terminal City Iron Works, Vancouver.
Vancouver Engineering Works, Vancouver.
Vancouver Machinery Depot, Vancouver.
Wonder Pump & Engine Company, Ltd., Vancouver.

Pumps, Ship.

Marine Iron Works, Ltd., Victoria.
Terminal City Iron Works, Vancouver.

Putty.

British American Paint Company, Ltd., Victoria.
Darling & Son, Henry, 28 Powell Street, Vancouver.

Ranges, Household.

Albion Stove Works, Ltd., Victoria.
Vancouver Stove & Heater Company, Ltd., 2100 Eleventh Avenue West, Vancouver.
McClary Manufacturing Company, Vancouver.

REFRIGERATORS.

Linde Canadian Refrigerator Company, Ltd., 500 Campbell Street, Vancouver.
Mitchell, George E., 453 Thurlow Street, Vancouver.

RETORTS.

Murray-Latta Machine Works, Vancouver.
Letson & Burpee, Ltd., Vancouver.
Ross & Howard Iron Works, Ltd., Vancouver.
Vancouver Engineering Works, Vancouver.
Vulcan Iron Works, Ltd., Granville Island, Vancouver.

RICE.

Asahi Rice Mills Company, 821 Powell Street, Vancouver.
Gim Fook Yuen, 1716 Government Street, Victoria.
Imperial Grain & Milling Company, 343 Railway Street, Vancouver.
Kozai, H., 758 Sixth Avenue West, Vancouver.
Mount Royal Milling & Manufacturing Company, 1824 Store Street, Victoria.
Sakai Tsurunosuke, 474 Alexander Street, Vancouver.
Sam Kee, 111 Pender Street East, Vancouver.
Shimizu, K., 1625 Store Street, Victoria.
Wing Chong & Company, 510 Cormorant Street, Victoria.
Wing Fung Company, 9 Canton Alley, Vancouver.

RINGS, PISTON.

Beatson, Frank, Granville Island, Vancouver.

ROLLERS, PRINTERS'.

Columbia Printing Ink & Roller Company, Vancouver.

ROOFING, FELT.

Sidney Roofing and Paper Company, Ltd., Victoria. "Sid-co"; "X"; "XX"; "XXX."

ROOFING, READY.

Barrett Company, Ltd., Vancouver. "Everlastic"; "Amazon"; "Vitex"; "Panamoid."
Pacific Roofing Company, Ltd., Granville Island, Vancouver. "Never-leak"; "Pioneer"; "Wovaloid."
Sidney Roofing & Paper Company, Ltd., Victoria. "Sid-co"; "Barbadoes"; "Premier."

ROPE, MANILA.

Canada Western Cordage Company, Ltd., New Westminster.

ROPE, WIRE.

Britannia Wire Rope Company, Ltd., Vancouver.

RUGS, AUTOMOBILE.

Canadian Western Woollen Mills, Ltd., 440 Clark Drive, Vancouver.

RUGS, FLUFF.

Pacific Coast Fluff Rug Company, 1061 Richards Street, Vancouver.
Vancouver Fluff Rug Company, Seventeenth Avenue West and Willow Street, Vancouver.

SADDLES.

Beer, A. J., West Summerland.
B.C. Saddlery Company, Ltd., Victoria.
Bryant, C. F., Nanaimo.
Duncan, William, Victoria.
Ferris, Walter, 1514 Fifth Avenue West, Vancouver.

Saddles—*Continued.*

Norris & Sons, F., Victoria.
McLaren, D. C., 211 Georgia Street East, Vancouver.
Okanagan Saddlery, Vernon.
Storey & Campbell, 518 Beatty Street, Vancouver.
Wilcox-Hall Company, Ltd., Kamloops.
Glenn & Son, W. R., Kelowna.
Nelson Company, Ltd., S., Vancouver.

Sails.

Grant-Holden-Graham, Ltd., Vancouver.
Jeune & Bro., Ltd., F., Victoria.
Jones, C. H., & Son, Ltd., Vancouver.
Lipsett, Edward, Vancouver.
Nugent & Company, H. M., Vancouver.

Sal Soda.

Pendray & Sons, Ltd., W. J., Victoria.
Royal Crown Soap, Ltd., 308 Georgia Street East, Vancouver.

Salad Dressing and Oils.

Kelly Confection Company, Ltd., 1106 Mainland Avenue, Vancouver.
Kelly, Douglas & Company, Ltd., Vancouver. "Nabob."
Vancouver Pickle Company, Ltd., Granville Island, Vancouver.
Western Pickling Works, Victoria. "Camosun."

Salmon, Canned.

Alert Bay Canning Company, Alert Bay.
Anglo-British Columbia Packing Company, Ltd., Vancouver.
British Columbia Canning Company, Victoria.
B.C. Fishing & Packing Company, Ltd., Vancouver.
Canadian Canning Company, Ltd., Eburne.
Canadian Fishing Company, Ltd., foot of Gore Avenue, Vancouver.
Canadian Fish & Cold Storage Company, Ltd., Prince Rupert.
Cassiar Packing Company, Ltd., Vancouver.
Glen Rose Canning Company, Ltd., New Westminster.
Clayoquot Canning Company, Ltd., Clayoquot.
C.L. Packing Company, Ltd., Vancouver.
DesBrisay Company, M., 403 Yorkshire Building, Vancouver.
Glenrose Canning Company, Ltd., New Westminster.
Gosse-Millard Canning Company, Ltd., Vancouver.
Great West Packing Company, Ltd., Steveston.
Gulf of Georgia Canning Company, Ltd., Steveston.
Hickey, Wm., Canning Company, Ltd., Vancouver.
Jervis Inlet Packing Company, Ltd., Vancouver.
Kildala Packing Company, Ltd., Vancouver.
Kincolith Packing Company, Ltd., Kincolith.
Lummi Bay Packing Company, Ltd., Lake Nitinat.
Maritime Fisheries, Ltd., Vancouver.
McPherson & Wilkinson, Vancouver.
Nootka Packing Company, Ltd., Nootka.
Northern B.C. Fishers, Ltd., Vancouver.
Quathiaski Canning Company, Ltd., Quathiaski Cove.
Redonda Canning & Cold Storage Company, Ltd., Vancouver.
Sooke Harbor Fishing & Packing Company, 505 Union Bank Building, Victoria.
Skeena River Commercial Company, Ltd., Vancouver.
St. Mungo Canning Company, Ltd., New Westminster.
Wallace Fisheries, Ltd., Vancouver.

SALMON, CANNED—*Continued.*

Western Salmon Packing Company, Ltd., Portland Inlet.
Nanaimo Canners & Packers, Ltd., Nanaimo.
Preston Packing Company, Ltd., Vancouver.
Western Packers, Ltd., Vancouver.
Saanich Canning Company, Ltd., Sidney.
Lockeport Canning Company, Ltd., Vancouver.
Sidney Canning Company, Ltd., Sidney.
Todd, J. H., & Sons, Victoria.
McTavish Fisheries, Ltd., Vancouver.

SALTS, EPSOM AND MINERAL.

Basque Chemical Production Company, Ltd., Epsom.
Nichols Chemical Company, Barnet.
Victoria Chemical Company, Ltd., Victoria.

SAND AND GRAVEL.

Champion & White, 1083 Main Street, Vancouver.
Deeks Gravel & Rock Company, Ltd., 744 Hastings Street West, Vancouver.
Eburne Gravel Company, 8935 Hudson Street, Eburne.
Fairview Sand & Gravel Company, Granville Island, Vancouver.
Harbor Sand & Gravel Company, Ltd., 626 Pender Street West, Vancouver.
Pacific Builders' Supply Company, foot of Angus, Eburne.
Producers Rock & Gravel Company, Ltd., Victoria.
Nicomen Sand & Gravel Company, Ltd., care Foundation Company, Vancouver.

SASH AND DOORS.

Arbuthnot, Mark, 101 Dufferin Street, Vancouver.
Arnot & Sons, John, Vancouver.
Becker, F. J., Armstrong.
Canada Sash & Door Company, 136 Lorne Street West, Vancouver.
Canadian Western Woodworkers, Ltd., Garbally Road, Victoria.
Cedar Cove Sash & Door Company, Ltd., 1101 Sixth Avenue West, Vancouver.
Chrystal & Company, Ltd., E., 108 Georgia Street East, Vancouver.
Cornish & Cooper, 245 Dufferin Street, Vancouver.
Drysdale, W. F., 1033 North Park Street, Victoria.
Engelland, Fred., 2525 McKinnon Street, South Vancouver.
Galbraith & Sons, New Westminster.
Fraser Mills Sash & Door Company, Fraser Mills.
Johnson, W., Sash & Door Factory, 854 Sixth Avenue West, Vancouver.
Hanbury, J., Ltd., Fourth Avenue and Granville Street, Vancouver.
Moore-Whittington Lumber Company, Victoria.
McLeod Sash & Door Company, Ltd., 1251 Charles Street, Vancouver.
Nanaimo Lumber Company, Ltd., Nanaimo.
Nelson Sash & Door Factory, Nelson.
Reid Sash & Door Factory, 1635 Third Avenue West, Vancouver.
Reynolds Sash & Door Company, 867 Park Avenue, Vancouver.
Robertson & Hackett Sash & Door Company, Ltd., Granville Street Bridge, Vancouver.
Robertson & McLaughlin, 1758 Fifteenth Avenue East, Vancouver.
Shockley, E. H., Prince Rupert.
Smith Lumber Company, Ltd., S. C., Vernon.
Waters & Company, Ltd., T. H., Nelson.
Brooks, James, Woodworking Company, Ltd., East Burnaby.
Cranbrook Sash & Door Factory, Cranbrook.
Helmer, R. D., 996 Sixth Avenue West, Vancouver.
Kamloops Sash & Door Factory, Kamloops.

Saw-sharpeners, Automatic.

Letson & Burpee, Ltd., Vancouver.

Saws.

Aetna Saw Works, Ltd., Granville Island, Vancouver.

Screens, Wire.

Artistic Iron Works, 116 Dufferin Street East, Vancouver.
B.C. Anchor & Fence Company, Ltd., Vancouver.
Pearson Wire Works, City Market, Vancouver.

Sheet-metal Products.

Ansell Sheet Metal Works, 2215 Thirteenth Avenue West, Vancouver.
Armstrong, E. L., 1329 Granville Street, Vancouver.
Atlas Steel Products, Ltd., Granville Island, Vancouver.
Barker, A. J., 516 Pender Street West, Vancouver.
British Columbia Ceiling & Roofing Company, Ltd., 823 Seventh Avenue West, Vancouver.
Campbell & Grill, 1238 Seymour Street, Vancouver.
Central Sheet Metal Works, 560 Cambie Street, Vancouver.
Grandview Sheet Metal Works, 1685 Venables Street, Vancouver.
Grafton, C. W., 153 Keefer Street, Vancouver.
Hamilton, F. N., 1618 Commercial Street, Vancouver.
H. & H. Sheet Metal Works, 735 Richards Street, Vancouver.
Hatch, James H., 63 Lansdowne Street, Vancouver.
Kirkland, J., 6244 East Boulevard, Kerrisdale.
Latimer & Sons, Ltd., 550 Main Street, Vancouver.
Lee, Johnson, 826 Dunsmuir Street, Vancouver.
Little Sheet Metal Works, Frank, 1168 Seymour Street, Vancouver.
Miller, John K., Company, Ltd., 580 Sixth Avenue West, Vancouver.
McLeod Sheet Metal Works, 1042 Richards Street, Vancouver.
Pacific Sheet Metal Works, Ltd., Yates Street, Victoria.
Pacific Sheet Metal Works (Vancouver), Ltd., Granville Island, Vancouver.
Penticton Pipe & Flume Works, Penticton.
Plunkett, D'Arcy B., 2519 Rock Bay Avenue, Victoria.
Sixth Avenue Sheet Metal Works, Prince Rupert.
Schwan, A. W., 8 Cordova Street East, Vancouver.
Steen & Longwill, Prince Rupert.
Tacey & Son, J. R., 660 Sixth Avenue West, Vancouver.
Terminal Sheet Metal Works, Ltd., 1043 Pender Street, Vancouver.
Trickey Company, S. J., 764 Cambie Street, Vancouver.
Vancouver Sheet Metal Company, Ltd., 1090 Hamilton Street, Vancouver.
Victoria Sheet Metal Works, 434 Kingston Street, Victoria.
New Idea Sheet Metal Works, Beatty Street, Vancouver.

Shirts, Cotton, Men's.

Gault Brothers, Ltd., 361 Water Street, Vancouver.
Turner, Beeton & Company, Ltd., Wharf Street, Victoria.
Thomson, James, & Sons, Ltd., Water Street, Vancouver.

Shock-absorbors.

Golightly Brothers, 753 Powell Street, Vancouver.

Show-cases.

Canadian Western Woodworkers, Ltd., Garbally Road, Victoria.
Chrystal & Company, E. C., 108 Georgia Street East, Vancouver.
Coutu, Louis, 1741 Main Street, Vancouver.
Dixon & Murray, 1065 Dunsmuir Street, Vancouver.

SHOW-CASES—*Continued.*

Johnson & Allen, 148 Lorne Street E., Vancouver.
C. Marston Cabinet Works, 3864 Commercial Drive, Vancouver.

SILICA.

B.C. Silica & Talc Company, Ltd., 470 Granville Street, Vancouver.

SILOS.

Canadian Pipe Company, Ltd., Vancouver.
Hoard Company, 421 Pemberton Building, Victoria.
Vancouver Wood Pipe & Tank Company, Ltd., Vancouver.

SMOKE-STACKS.

B.C. Iron Works, Victoria.
Blain, A. A., 1147 Venables Street, Vancouver.
Marine Iron Works, Victoria.
Miller, John K., Company, Ltd., Vancouver.
Morris, S. M., & Company, Ltd., Vancouver.
Patterson Boiler Works, 750 Alexander Street, Vancouver.
Ross & Howard, Vancouver.
Vancouver Engineering Works, Vancouver.
Victoria Machinery Depot Company, Ltd., Victoria.
Vulcan Iron Works, Vancouver.
Yarrows, Ltd., Victoria.

SOAP, LAUNDRY.

Pendray & Sons., Ltd., W. J., Victoria. "White Swan."
Royal Crown Soaps, Ltd., 308 Georgia Street East, Vancouver. "Royal Crown"; "White Wonder"; "Royal Crown Naphtha"; "Sunlight"; "Life Buoy."

SOAP, LIQUID.

Western Industrial Development Company, 1043 Hamilton Street, Vancouver.
Peerless Products, Ltd., 1642 Pandora Street, Vancouver. "Peerless."
Pendray, W. J. & Sons, Ltd., Victoria. "Pendray's."

SOAP, TOILET.

Henrietta Toilet Preparation, 649 Seymour Street, Vancouver. "Henrietta."
Royal Crown Soaps, Ltd., 308 Georgia Street East, Vancouver. "Crown Oatmeal"; "Witch Hazel"; "Crown Olive."

SODA, SAL.

Pendray, W. J., & Sons, Ltd., Victoria.
Royal Crown Soaps, Ltd., 308 Georgia Street East, Vancouver.

SODIUM CARBONATE.

Canadian Carbonate, Ltd., Eleventh Avenue and Yew Street, Vancouver.
Lillooet Soda Company, Ltd., 502 Northwest Building, Vancouver.
Pendray, W. J., & Sons, Ltd., Victoria.

SPICES, GROUND.

Empress Manufacturing Company, Ltd., 1106 Homer Street, Vancouver. "Empress"; "Climax."
Jameson & Company, Ltd., W. A., Broughton Street, Victoria. "Jameson."
Kelly, Douglas & Company, Ltd., Vancouver. "Nabob."
Malkin Company, Ltd., W. H., Vancouver. "Malkin's Best."

SPRAYERS, COMPRESSED AIR.

Tacey & Son, J. R., 550 Sixth Avenue West, Vancouver.

Spraying Material, Tree and Plant.

British America Paint Company, Victoria.
McClounie, J., & Sons, Vernon.

Springs, Automobile.

McAllister Spring Company, Ltd., 1132 Richards Street, Vancouver.
Peile, Harrison, Duncan.

Springs, Bed.

Restmore Manufacturing Company, Ltd., Vancouver.
Simmons, Ltd., 2034 Eleventh Avenue West, Vancouver.
Victoria Bed & Mattress Company, Ltd., 776 Topaz Avenue, Victoria.

Springs, Coil.

McAllister Spring Company, Ltd., 1132 Richards Street, Vancouver.

Springs, Locomotive.

McAllister Spring Company, Ltd., 1132 Richards Street, Vancouver.

Stains.

Ayres Varnish & Paint Company, Vancouver.
Brandram-Henderson Company, 470 Granville Street, Vancouver.
British America Paint Company, Ltd., Victoria.
Crown Paint Company, 24 Cordova Street East, Vancouver.
Darling & Son, Henry, 28 Powell Street, Vancouver.
Martin-Senour Company, Ltd., 1505 Powell Street, Vancouver.
National Paint Company, Granville Island, Vancouver.
Sherwin-Williams Company of Canada, Ltd., Vancouver.

Starch, Potato.

Dominion Starch & Dextrine Company, Ltd., New Westminster.

Steel Plates, Beams, etc.

Canadian Northwest Steel Company, Ltd., Vancouver.
Coughlan & Sons, J., Ltd., Front and Columbia Streets, Vancouver.

Stone, Building.

Canadian Marble & Granite Works, Ltd., Nelson.
Coast Quarries, Ltd., 911 Metropolitan Building, Vancouver.
Granite Quarries, Ltd., 315 Bower Building, Vancouver.
Keast & Allen, 880 Beach Avenue, Vancouver.
McDonald, J. A. and C. H., 157 Main Street, Vancouver.
Sechelt Granite Quarry, Ltd., Winch Building, Vancouver.
Vancouver Granite Company, Ltd., 815 Bower Building, Vancouver.

Stone, Cut and Dressed.

Art Monument Company, 602 Fifteenth Avenue East, Vancouver.
B.C. Supply Company, Vancouver.
Bertram, W. N., 4880 Fraser Avenue, Vancouver.
Canadian Marble & Granite Works, Ltd., Nelson.
Keast & Allen, 880 Beach Avenue, Vancouver.
Mortimer & Son, John, Courtney Street, Victoria.
Newell, J. B., 5085 Fraser Avenue, Vancouver.
Patterson, Chandler & Stephen, 3149 Main Street, Vancouver.
Phillips Stone Works, 1502 Fairfield Road, Victoria.
Stewart Monumental Works, Ltd., 1401 May Street, Victoria.
Stewart & Willey, 5332 Fraser Avenue, Vancouver.

STONE, CUT AND DRESSED—*Continued.*

Vernon Granite & Marble Company, Ltd., Vernon.
British Columbia Monumental Works, 339 Columbia Street, New Westminster.

STONE, ART.

Dawson Art Stone Co., 294 Front Street East, Vancouver.

STOVES, HEATING AND COOKING.

Albion Stove Works, Ltd., Victoria.
McLean & Powell Iron Works, Dufferin Street, Vancouver.
McClary Manufacturing Company, Ltd., Vancouver.
Vancouver Stove & Heater Company, Ltd., 2100 Eleventh Avenue West, Vancouver.

STUMP-PULLERS.

Hall Machine Works, Vancouver.
Olson Iron Works, M. O., 309 Alexander Street, Vancouver.
Opsal Steel Company, Vancouver.

SUGAR, REFINED.

British Columbia Sugar Refining Company, Ltd., Vancouver.

SWEATERS AND SWEATER COATS.

Maple Leaf Knitting Company, Vancouver.
Pride of the West Knitting Mills, Ltd., 500 Beatty Street, Vancouver. "Pride of the West."
Quigley Knitting Mills, Ltd., 78 Dufferin Street East, Vancouver. "Q."
Universal Knitting Company, Ltd., 303 Pender Street West, Vancouver. "Universal."

SWEEPING COMPOUNDS.

Western Industrial Development Company, Vancouver. "Rex."
Staneland Company, Ltd., Fort Street, Victoria. "Nodust."

SWITCHBOARDS.

Cope & Son, Ltd., 100 Front Street East, Vancouver.
Electrical Manufacturing Company, Granville Island, Vancouver.

SYRUP.

British Columbia Sugar Refining Company, Ltd., Vancouver.
Kelly Confection Company, Ltd., 1106 Mainland Avenue, Vancouver.
Ramsay Brothers & Company, Ltd., 990 Powell Street, Vancouver.

TANKS, METAL.

Blain, A. A., 1147 Venables Street, Vancouver.
B.C. Iron Works, Victoria.
Latimer & Sons, Ltd., 550 Main Street, Vancouver.
Marine Iron Works, Victoria.
Patterson Boiler Works, 750 Alexander Street, Vancouver.
Ross & Howard, Vancouver.
Vancouver Engineering Works, Vancouver.
Victoria Machinery Depot, Victoria.
Vulcan Iron Works, Ltd., Granville Island, Vancouver.

TANKS, WOOD.

Canadian Pipe Company, Ltd., 550 Pacific Street, Vancouver.
Pacific Coast Pipe Company, Ltd., 1551 Granville Street, Vancouver.
Vancouver Wood Pipe & Tank Company, Ltd., 850 Hastings Street West, Vancouver.

TAR, WOOD.

Acetate Products, Ltd., New Westminster.

Tents.

Jeune, F., & Bro., Ltd., 570 Johnson Street, Victoria.
Jones & Son, Ltd., C. H., 28 Water Street, Vancouver.
Lipsett, Edward, 68 Water Street, Vancouver.
Victoria Tent Factory, 618 Pandora Street, Victoria.
Nugent, H. M., & Company, 48 Water Street, Vancouver.
Rigby, George, 1821 Broad Street, Victoria.
Grant-Holden-Graham, Ltd., 1260 Hamilton Street.

Tiles.

(New) Baker Brick & Tile Company, Victoria.
Bazan Bay Brick & Tile Company, Ltd., Sidney.
Port Haney Brick Company, Ltd., Port Haney.
Polychrome Cement Brick & Tile Company, Granville Island, Vancouver.
Sidney Island Brick & Tile Company, Sidney Island.
Victoria Brick & Tile Company, Victoria.

Tires, Automobile (Pneumatic).

Gregory Tire & Rubber Company, Ltd., Port Coquitlam. "Gregory."

Toques, Knitted.

Pride of the West Knitting Mills, Ltd., 500 Beatty Street, Vancouver.
Quigley Knitting Company, 56 Dufferin Street East, Vancouver.
Universal Knitting Company, 303 Pender Street West, Vancouver.

Toys.

Canada Dolls, Ltd., Victoria Drive, Vancouver.
Columbia Pulleys, Limited, 624 Eighteenth Avenue East, Vancouver.
Doll Hospital, 419 Hastings Street West, Vancouver.
Gosling, Q. A., Murrayville.
Hiker Manufacturing Company, Esquimalt Road and Williams Street, Victoria. "Hiker."
Trubilt Toy Company, Ltd., 2760 Yew Street, Vancouver. "Trubilt."
Watson Canadian Toys, Ltd., 616 Davie Street, Vancouver.
Western Toy & Furniture Manufacturing Company, Ltd., 3537 Main Street, Vancouver.

Transmission Appliances.

All foundries with engineering plants and all engineering works.

Trays, Cement.

Henson & Dyson Company, 403 Gorge Road, Victoria.
Hunter Cement Company, Clinton and Twenty-second Avenue, Vancouver.
Ideal Cement Laundry Tray Company, 190 Lorne Street, Vancouver.
Star Cement Laundry Tray Company, 25 Lorne Street West, Vancouver.

Trunks.

B.C. Leather & Findings Company, Ltd., 117 Pender Street West, Vancouver.
B.C. Saddlery Company, Ltd., Victoria.
Burns, J. F., 519 Granville Street, Vancouver.
Imperial Trunk & Leather Goods, Ltd., 338 Hastings Street West, Vancouver.
Norris & Son, F., Government Street, Victoria.
Duncan, William, Douglas Street, Victoria.
Storey & Campbell, 518 Beatty Street, Vancouver.
Vancouver Trunk & Bag Company, Ltd., 1424 Charles Street, Vancouver.

Twine, Hemp.

Canada Western Cordage Company, Ltd., New Westminster.

UNDERWEAR, WOMEN'S.

Dall Lace Company, Ltd., 615 Granville Street, Vancouver.
Thomson & Sons, James, 353 Water Street, Vancouver.

VARNISHES.

Ayres Varnish & Paint Company, Ltd., Raymur and Parker Streets, Vancouver.
Brandram-Henderson of B.C., Ltd., 1170 Granville Street, Vancouver.
British America Paint Company, Ltd., Victoria.
Crown Paint Company, 24 Cordova Street East, Vancouver.
Darling, Henry, & Son, 28 Powell Street, Vancouver.
Martin-Senour Company, Ltd., 1505 Powell Street, Vancouver.
National Paint Company, Ltd., Granville Island, Vancouver.
Staneland Company, Ltd., Fort Street, Victoria.
Sherwin-Williams Company of Canada, Ltd., Vancouver.
Williams, Stanner & Harte, Ltd., Victoria.

VEGETABLES, CANNED.

Broder Canning Company, Ltd., New Westminster. "Fraser Valley Brand"; "Royal City Brand."
Dominion Canners, B.C., Ltd., Vancouver. "Quaker."
Kamloops Canneries, Ltd., Kamloops.
Keremeos Packing Company, Ltd., Keremeos. "Diamond K."
Occidental Fruit Company, Ltd., Kelowna. "Okanagan."
Okanagan Canning Company, Kelowna. "Duncan's Best."

VINEGAR.

Dyson Vinegar Company, Ltd., Vancouver. "Dyson's Pure Malt"; "Dyson's Pure Spirit"; "Dyson's Pure Cider"; "Sunset Brand."
Empress Manufacturing Company, Ltd., Vancouver. "Empress"; "Climax."
Malkin Company, Ltd., W. H., Vancouver. "Malkin's Best"; "Tropical."
O.U.G. Fruit Products, Ltd., Vernon. "O.K."
Syms, W. J., Salmon Arm.
Vancouver Pickle Company, Ltd., Vancouver.
Western Pickling Works, Victoria.

WASH-BOARDS.

Crown Broom Works, Ltd., Vancouver. "Crown Glass"; "Crown Globe."
Waters, T. H., & Company, Ltd., Nelson. "B.C. Brand."

WATER, AERATED.

Canadian Carbonate, Ltd., Eleventh Avenue and Yew Street, Vancouver.
Coca-Cola Company, Richards Street, Vancouver.
Cross & Company, 38 Lansdowne Avenue East, Vancouver.
Fairall's, Ltd., 420 Williams Street, Victoria.
Fernie-Fort Steele Brewing Company, Ltd., Fernie.
Halcyon Bottling Works Company, Halcyon.
Henley & Company, J., New Westminster.
Harper, James, Rossland.
Nelson Brewing Company, Ltd., Nelson.
Orange Crush Bottling Company, Ltd., 136 Water Street.
Pioneer Bottle Works, Nanaimo.
Thorpe & Company, Ltd., Victoria and Vancouver.
Vancouver Breweries, Ltd., Eleventh Avenue and Yew Street, Vancouver.
Vancouver Botanic Beverage Company, Vancouver.
Victoria Botanic Beverage Company, 2620 Cedar Hill Road, Victoria.
Acme Soda Water Works, 208 Simpson Street, New Westminster.

WATERGLASS.

Pendray & Sons, Ltd., W. J., Victoria. "Pendray's."

WAX. FLOOR.

B.C. Hardware Floor Company, Ltd., Victoria and Vancouver. "Marless."
Western Industrial Development Company, 1043 Hamilton Street, Vancouver.

WHEAT-FLAKES.

Brackman-Ker Milling Company, Limited, Victoria.

WHISKS.

Crown Broom Works, Ltd., 304 Front Street East, Vancouver.
Western Broom Works, 631 Fifteenth Avenue East, Vancouver.

WHISKY.

British Columbia Distillery Company, Ltd., New Westminster.

WHITE LEAD, GROUND IN OIL.

Pacific White Lead Company, Ltd., Granville Island, Vancouver.

ZINC.

Consolidated Mining & Smelting Company of Canada, Ltd., Trail.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1922.

PROVINCE OF BRITISH COLUMBIA

DEPARTMENT OF ATTORNEY-GENERAL

REPORT

OF THE

INSPECTOR OF MUNICIPALITIES

FOR THE YEAR ENDING

DECEMBER 31ST, 1921

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1922.

To His Honour Walter Cameron Nichol,

Lieutenant-Governor of the Province of British Columbia.

May it please Your Honour:

I have the honour to transmit herewith the Annual Report of the Inspector of Municipalities for the year ending December 31st, 1921.

All of which is respectfully submitted.

A. M. MANSON,

Attorney-General.

Victoria, June 15th, 1922.

REPORT OF THE INSPECTOR OF MUNICIPALITIES.

VICTORIA, B.C., June 15th, 1922.

Hon. A. M. Manson,
Attorney-General.

SIR,—I submit herewith my statistical report showing results of the financial activities of the municipalities of the Province for the year ending December 31st, 1921, and I include therewith a statement of the assessment figures for the year 1922; also the details of the tax levy for the year 1922.

The statements which I submit herewith are:—

I.—Assessments, 1922.—The assessment figures show a reduction of $16,356,981.24 in the assessed values of land and an increase of $24,777,541.72 in the assessed values of improvements. The reduction in the assessed values of land is a continuation of the process which has been necessary for a number of years of reducing assessments in various parts of the different municipalities to bring them down from the inflated values which prevailed some years ago to a normal selling value. Since the year 1915 the assessed value of the land in the municipalities has been reduced from $486,540,635.77 to $332,789,774.58, while the assessed value of improvements has been increased from $196,346,306.88 to $221,418,811. The increase in the value of improvements, of course, represents a normal development of the lands, chiefly by way of building construction.

In connection with the assessment figures it is shown that among the cities there are ten which still exempt improvements entirely from taxation, as compared with eighteen in the year 1915, and among the districts there are now fifteen which exempt improvements, as compared with twenty in 1915.

II.—Tax Levy, 1922.—The details as submitted in this schedule show that the tax levy for the year 1922 has not greatly changed from that of 1921.

III.—Liabilities as of December 31st, 1921.—This schedule shows that the debenture liabilities on this date amounted to $97,495,983.83, an increase of $1,388,073.53 over the previous year. The situation in this respect is quite satisfactory. The year 1914 was the first year with respect to which complete and accurate figures were obtainable, and since that date the increase in debenture liability has been slightly over $9,000,000. In view of the fact that in the year 1912 alone debentures were issued by the municipalities of the Province in excess of $20,000,000, and in the year 1913 to the amount of approximately $23,000,000, the results of the years from 1914 to 1921 may be considered to have been on the whole quite satisfactory, although it must be pointed out that a continuation of the policy of these last years is necessary for some considerable time to come.

IV.—Sinking Funds as of December 31st, 1921.—The statistics setting out the conditions of the sinking funds indicate that there are shortages amounting to $5,502,666.61, slightly less than at the close of the year 1920. Good progress has been made in the majority of the municipalities in the way of strengthening their sinking fund assets, and the excellent investments which have been available in recent years have given a great deal of assistance in this respect, but it will be noted that in a few cases the situation shows a tendency in the opposite direction. Unfortunately the figures as given to represent the sinking fund investments are not consistent in their meaning throughout the list, and I have not been able to obtain a uniform report in respect of these investments. In the greater number of cases the figures show the amount actually invested, but in a few instances they indicate only the face value of certain bonds and debentures which have been purchased at a discount.

I am not able to agree that it is a good policy to write up these bonds at once to their par value and show a sudden increase in assets when in reality there is no greater value than before. It is quite true that if succeeding Councils hold these bonds to the date of maturity they will realize their face value, but it is misleading to say, for example, that $70 can be at once

converted into $100 by the exchange of one security for another only equally valuable as an asset. I am of opinion that the Statute governing the sinking funds might very well be amended so as to ensure uniformity in the valuation of these assets.

It is to be noted that there are still irregular investments of sinking funds made from time to time, the irregularities consisting chiefly of investments made by some of the municipalities in their own debentures. Under our Statutes a municipality is not permitted to invest its sinking funds in its own debentures, except to this extent: that it may redeem debentures from the sinking fund of the particular issue to which the debentures belong, but when they are so redeemed they cannot be held as an investment but must be cancelled. In some cases purchases of debentures for investment have been made, and the result of the purchase has been that debentures still left outstanding have been improperly robbed of a substantial portion of their value. I would suggest that in view of some of the transactions which have taken place a further check should be placed upon the administration of these moneys.

V.—Arrears of Taxes.—The amount of the arrears of taxes outstanding is $6,964,164.86, as compared with $8,433,066.57 at the close of 1920. This shows a substantial reduction of outstanding arrears, but at the same time the investments of the municipalities in lands purchased at tax sale have increased from $5,247,788.34 to $6,507,912.65.

VI. and VII.—The schedules of Receipts and Expenditures represent as nearly as possible the cash transactions of the municipalities during the year. It is not yet possible to prepare a general statement of the administration of the year's actual revenue, but the details of Receipts and Expenditures now show approximately the same result as would be seen from such a statement.

The tax collections for the year are slightly less than the preceding year, but the gross amount of the cash receipts is slightly in excess.

The expenditures for the year have increased, however, from $20,686,963.59 to $22,591,159.74. The items showing the heaviest proportion of increase being expenditures on roads and streets, on administration of justice, and on schools. It is to be noted that although the taxes actually collected were slightly over $1,000,000 greater than the tax levy for the year, yet the total of the moneys received during the year was approximately $750,000 less than the amounts paid out. I would suggest that the greater portion of this deficit is the result of an unfortunate policy of keeping the tax rate as low as possible regardless of the condition of the balance at the end of the year. The policy which is being followed shows no prospect of getting rid of the burden of current liabilities, which seems as a matter of fact to be increasing from year to year.

VIII.—Taxes levied, 1921.—The amount of the taxes levied in 1921 was $13,357,860.84, as compared with $13,802,623.89 in the previous year.

IX.—Comparative Statement of Moneys collected from Principal Sources of Revenue, 1914 to 1921.

X.—Comparative Statement of Expenditures on Streets, Fire, Administration of Justice, Public Health, Council Salaries, and Schools, 1914 to 1921.

XI.—Money By-laws certified during the Year.—These amount to $1,567,272.28, as compared with $2,149,057.35 in the previous year.

XII.—Public Utilities.—It is pleasing to note that a substantial increase has been made in the amount of moneys received from public utilities; the receipts during the year being $2,911,165.51, as compared with $2,503,620.93 in the previous year, and comparing these receipts with those of the year 1917, the first year of which there is any complete record, it shows an increase from $1,869,742.17.

ROBERT BAIRD,
Inspector of Municipalities.

I.—ASSESSMENTS, 1922.

CITIES.

Municipality.	Value of Taxable Land.	Value of Taxable Improvements.	Total Taxable Property.	Land and Improvements exempt from Taxation.	Grand Total.	Percentage Improvements taxed.	Population.	Area in Acres.
Alberni	$ 281,900 00	$ 196,800 00	$ 478,700 00	$ 132,340 00	$ 611,040 00	*Nil*	510	1,553
Armstrong	560,647 00	534,200 00	1,094,847 00	198,825 00	1,293,672 00	50	1,000	1,000
Chilliwack	812,010 00	917,400 00	1,729,410 00	231,125 00	1,960,535 00	20	1,800	1,040
Courtenay	538,592 00	185,215 00	723,807 00	33,000 00	756,807 00	50	810	800
Cranbrook	553,175 00	1,314,050 00	1,867,225 00	.....	1,867,225 00	50	2,725	200
Cumberland	130,040 00	268,330 00	398,370 00	93,850 00	492,220 00	50	1,045	40
Duncan	712,967 00	580,750 00	1,293,717 00	136,900 00	1,430,617 00	*Nil*	1,200	500
Enderby	363,960 00	341,930 00	705,890 00	152,340 00	858,230 00	50	800	655
Fernie	843,437 00	1,381,100 00	2,224,537 00	588,050 00	2,812,587 00	50	2,800	331
Grand Forks	476,410 00	562,300 00	1,038,710 00	610,975 00	1,649,685 00	50	1,500	1,697
Greenwood	92,210 00	144,770 00	236,980 00	285,430 00	522,410 00	33⅓	400	646
Kamloops	2,521,813 00	2,345,500 00	4,867,313 00	1,076,461 00	5,943,774 00	25	4,500	912
Kaslo	194,760 00	251,520 00	446,280 00	149,956 00	596,236 00	50	950	400
Kelowna	1,600,928 00	2,228,400 00	3,829,328 00	419,260 00	4,248,588 00	33⅓	2,600	1,281
Ladysmith	376,080 00	335,505 00	711,585 00	92,325 00	803,910 00	50	2,000	220
Merritt	548,939 00	538,485 00	1,087,424 00	207,200 00	1,294,624 00	*Nil*	1,800	1,615
Nanaimo	2,306,298 00	2,904,335 00	5,210,633 00	457,455 00	5,668,088 00	*Nil*	8,900	720
Nelson	2,040,990 00	2,976,680 00	5,017,670 00	602,093 00	5,619,763 00	50*	5,300	751
New Westminster	9,550,000 00	34,250 00	9,584,250 00	15,265,690 00	24,849,940 00	50	15,000	3,481
North Vancouver	8,540,478 00	3,948,660 00	12,489,138 00	2,015,595 00	14,504,733 00	*Nil*	7,700	2,750
Port Alberni	735,167 00	854,740 00	1,589,907 00	214,390 00	1,804,297 00	*Nil*	1,100	1,960
Port Coquitlam	2,254,086 00	643,575 00	2,897,661 00	1,500,107 00	4,397,768 00	*Nil*	2,150	6,200
Port Moody	1,516,230 00	1,010,710 00	2,526,940 00	286,852 52	2,813,792 52	*Nil*	1,200	3,000
Prince George	1,819,416 00	1,513,097 00	3,332,513 00	.....	3,332,513 00	*Nil*	2,050	1,092
Prince Rupert	8,461,091 00	5,141,839 00	13,602,930 00	3,375,171 00	16,978,101 00	*Nil*	6,500	2,240
Revelstoke	1,115,875 00	1,370,750 00	2,486,625 00	672,200 00	3,158,825 00	50	2,800	595
Rossland	594,895 00	1,106,525 00	1,701,420 00	600,615 00	2,302,035 00	50	2,100	1,920
Salmon Arm	474,186 50	368,870 00	843,056 50	74,517 50	917,574 00	50	650	520
Slocan	54,995 00	55,600 00	110,595 00	32,504 00	143,099 00	25†	430	192
Trail	575,783 00	1,441,990 00	2,017,773 00	146,310 00	2,164,083 00	50	3,100	664
Vancouver	132,451,815 00	79,268,070 00	211,719,885 00	.....	211,719,885 00	50	117,000	10,784
Vernon	2,059,340 00	1,791,017 00	3,850,357 00	766,925 00	4,617,282 00	50	3,700	2,006
Victoria	38,789,258 00	26,990,410 00	65,779,668 00	13,048,078 00	78,827,746 00	33⅓	38,750	4,637
Totals	$223,947,771 50	$143,547,373 00	$367,495,144 50	$ 43,466,540 02	$410,961,684 52	...	244,870	56,390

* For school purposes only. † For general purposes and 10 per cent. for debt.

Districts.								
Burnaby	$ 13,012,155 00	$ 4,941,833 00	$ 17,953,988 00	$ 4,371,539 00	$ 22,325,527 00	*Nil*	15,000	21,500
Chilliwhack	3,042,040 00	975,450 00	4,017,490 00	.....	4,017,490 00	*Nil*	7,500	45,000
Coldstream	800,609 00	2,195,729 00	2,996,338 00	.....	2,996,338 00	*Nil*	325	17,000
Coquitlam	1,870,071 00	300,785 00	2,170,856 00	436,705 00	2,607,561 00	*Nil*	2,450	37,120
Delta	1,017,585 00	5,631,155 00	6,648,740 00	69,100 00	6,717,840 00	50	2,500	42,000
Esquimalt	3,625,225 00	1,779,284 00	5,404,509 00	1,363,396 00	6,767,905 00	*Nil*	5,000	1,500
Fraser Mills	142,920 00	319,939 00	462,859 00	.....	462,859 00	50	850	390.46
Kent	961,457 25	416,040 00	1,377,497 25	.....	1,377,497 25	*Nil*	1,050	47,360
Langley	2,261,110 00	2,142,902 00	4,404,012 00	104,297 00	4,508,309 00	50*	4,500	75,907
Maple Ridge	1,905,980 00	1,202,645 00	3,108,625 00	58,575 00	3,167,200 00	50*	4,000	45,000
Matsqui	2,214,404 00	2,065,594 00	4,279,998 00	13,742 00	4,293,740 00	50†	4,000	54,145
Mission	1,004,959 00	1,744,758 00	2,749,717 00	63,489 00	2,813,206 00	50	3,500	52,000
North Cowichan	2,252,055 00	2,786,725 00	5,038,780 00	104,550 00	5,143,330 00	10	2,900	35,000
North Vancouver	5,811,892 00	2,823,903 00	8,635,795 00	2,425,256 00	11,061,051 00	*Nil*	5,000	48,000
Oak Bay	4,109,570 00	3,831,705 00	7,941,275 00	502,055 00	8,443,330 00	*Nil*	6,000	2,552
Peachland	286,050 00	214,150 00	500,200 00	46,210 00	546,410 00	50‡	450	3,520
Penticton	1,921,540 00	2,979,630 00	4,901,170 00	650,458 00	5,551,628 00	10	4,000	7,044
Pitt Meadows	1,119,155 00	281,687 00	1,400,842 00	2,650 00	1,403,492 00	50	420	14,000
Point Grey	19,846,314 05	16,451,045 00	36,297,359 05	1,297,993 00	37,595,352 05	*Nil*	20,000	12,000
Richmond	5,224,947 00	1,687,874 00	6,912,821 00	262,679 00	7,175,500 00	50	5,000	30,000
Saanich	10,682,140 00	5,110,328 00	15,792,468 00	543,868 00	16,336,336 00	*Nil*	12,000	45,000
Salmon Arm	916,132 00	880,620 00	1,796,752 00	2,060 00	1,798,812 00	*Nil*	4,000	46,080
South Vancouver	13,343,388 88	9,725,651 00	23,069,039 88	4,061,318 80	27,130,358 68	50	30,000	9,200
Spallumcheen	2,011,445 00	562,511 00	2,573,956 00	22,570 00	2,596,526 00	*Nil*	1,820	65,000
Sumas	642,281 00	370,830 00	1,013,111 00	18,100 00	1,031,211 00	50	600	19,100
Summerland	1,350,028 90	2,094,010 00	3,444,038 90	228,322 00	3,672,360 90	*Nil*	1,850	13,000
Surrey	4,613,942 00	3,134,425 00	7,748,367 00	.....	7,748,367 00	*Nil*	5,500	76,000
West Vancouver	2,852,607 00	1,220,230 00	4,072,837 00	431,883 00	4,504,720 00	*Nil*	3,000	24,320
Totals	$108,842,003 08	$ 77,871,438 00	$186,713,441 08	$ 17,080,815 80	$203,794,256 88	...	153,215	888,738.46
Cities forward	223,947,771 50	143,547,373 00	367,495,144 50	43,466,540 02	410,961,684 52	...	244,870	56,390
Cities and districts..	$332,789,774 58	$221,418,811 00	$554,208,585 58	$ 60,547,355 82	$614,755,941 40	...	398,085	945,128.46

* For school purposes only.
† Taxes levied upon 50 per cent. of assessed value of improvements which exceed $8,000.
‡ Fire area only.

II.—TAX LEVY, 1922—CITIES.

Municipality.	General.	School.	Debt.	Total.	Total Levy Previous Year.
Alberni	14.0	13.0	28.0	55.0	40.0
Armstrong	14.0	11.0	8.4	33.4	32.0
Chilliwack	18.5	15.5	16.0	50.0	52.0
Courtenay	15.0	11.0	9.0	35.0	25.8
Cranbrook	10.0	20.0	16.0	46.0	45.0
Cumberland	20.0	19.0	...	39.0	39.0
Duncan	12.0	13.0	4.0	29.0	29.0
Enderby	11.2	14.3	8.5	34.0	38.0
Fernie	12.62	20.43	6.95	40.0	40.0
Grand Forks	6.0	15.0	16.0	37.0	37.0
Greenwood	6.0	19.0	39.0	64.0	64.0
Kamloops	...	13.72	26.28	40.0	40.0
Kaslo	15.3	22.1	1.6	39.0	39.0
Kelowna	9.279	13.333	14.888	37.5	40.0
Ladysmith	12.0	20.0	5.0	37.0	42.0
Merritt	9.0	18.0	13.0	40.0	37.0
Nanaimo	9.24	20.27	17.49	47.0	48.0
Nelson	13.25	16.125	12.0	41.375	44.0
New Westminster	2.0	15.0	28.0	45.0	36.0
North Vancouver	9.2	10.75	12.05	32.0	34.0
Port Alberni	18.4	1.6	30.0	50.0	40.0
Port Coquitlam	12.0	4.24	15.76	32.0	29.5
Port Moody	12.5	5.5	7.0	25.0	25.0
Prince George	2.0	10.0	23.0	35.0	37.5
Prince Rupert	19.5668	9.4522	8.2992	37.3182	30.82
Revelstoke	13.0	15.0	6.0	34.0	35.0
Rossland	1.0	20.0	19.0	40.0	40.0
Salmon Arm	10.0	12.0	10.0	32.0	32.0
Slocan	20.0	32.0	10.0	62.0	47.0
Trail	18.8	14.9	3.9	37.6	38.6
Vancouver	14.197	8.612	8.857	31.666	31.666
Vernon	11.0	12.0	17.0	40.0	40.0
Victoria	11.95	9.4	10.71	32.06	29.0

DISTRICTS.

Municipality.	General.	School.	Debt.	Total.	Total Levy Previous Year.
Burnaby	11.2 (27.2)	11.8	11.0	34.0 (50)	33.0 (50)
Chilliwhack	10.0	13.0	0.72	23.72	20.7
Coldstream	13.5	2.5	10.8	26.8	28.1
Coquitlam	8.0 (15)	4.0	3.0	15.0 (22)	14.0 (20)
Delta	7.0	3.75	1.5	12.25	14.5
Esquimalt	13.55	9.95	...	23.5	18.5
Fraser Mills	9.0	...	...	9.0	9.0
Kent	8.0	12.0	...	20.0 (35)	16.0 (43)
Langley	12.0 (40)	10.0	...	22.0 (50)	20.0 (50)
Maple Ridge	12.0 (30)	11.0	...	23.0 (41)	23.0
Matsqui	12.0 (25)	10.0	...	22.0 (35)	22.0 (35)
Mission	18.0	9.0	...	27.0 (50)	33.0
North Cowichan	9.0 (25)	4.0	0.5	13.5 (29.5)	19.0 (30.5)
North Vancouver	13.0	8.4	9.5	30.9	31.0
Oak Bay	11.13	13.42	5.2	29.75	31.25
Peachland	14.0	19.0	9.0	42.0	41.0
Penticton	20.0	23.5	5.5	49.0	44.5
Pitt Meadows	7.5 (30)	3.5	...	11.0 (33.5)	10.0 (27)
Point Grey	9.18 (15.18)	13.25	16.57	39.0 (45)	36.0 (45)
Richmond	12.75	5.25	3.0	21.0	22.0
Saanich	7.31	7.91	4.78	20.0	20.0
Salmon Arm	9.5 (29.5)	14.5	5.0	29.0 (49)	25.5 (20)
South Vancouver	16.51 (11.51)	21.52	16.97	55.0 (50)	41.4
Spallumcheen	5.75	11.25	1.75	18.75	18.75
Sumas	15.0	7.0	...	22.0	22.0
Summerland	10.0	18.0	12.0	40.0	43.0
Surrey	14.0 (30)	10.0	...	24.0 (40)	22.0 (38)
West Vancouver	17.0	6.5	12.5	36.0	27.0

Bracketed figures represent tax on wild land.

	Unemployment Relief.	Total Debenture Debt.	Sundry Outstanding Debts Exclusive of Shortage in Sinking Fund.	Grand Total.
Alberni	.....	$ 70,130 00	$ 2,462 63	$ 72,592 63
Armstro	.....	189,450 61	6,486 37	195,936 98
Chilliwa	.....	253,545 29	.....	253,545 29
Courten	.....	214,900 00	13,407 66	228,307 66
Cranbro	.....	366,116 40	18,745 36	384,861 76
Cumberl	.....	.....	.....	.....
Duncan	.....	149,100 00	824 08	149,924 08
Enderby	.....	90,000 00	2,500 00	92,500 00
Fernie	.....	393,160 72	407 15	393,567 87
Grand F	.....	97,800 00	.....	97,800 00
Greenwo	.....	58,072 25	.....	58,072 25
Kamloo	.....	1,239,500 00	22,140 78	1,261,640 78
Kaslo .	.....	48,000 00	.....	48,000 00
Kelowna	.....	465,725 13	5,307 55	471,032 68
Ladysmi	.....	96,477 25	7,021 45	103,498 70
Merritt	.....	124,000 00	.....	124,000 00
Nanaimo	.....	1,027,424 87	.....	1,027,424 87
Nelson	.....	591,633 23	19,959 26	611,592 49
New W	$ 25,000 00	6,002,452 84	159,731 29	6,162,184 13
North V	.....	3,042,525 50	361,695 98	3,404,221 48
Port Al	.....	245,800 00	3,109 85	248,909 85
Port Co	.....	582,950 00	63,929 89	646,879 89
Port Mo	.....	173,300 00	126,380 70‡	299,680 70
Prince	.....	425,000 00	30,824 21	455,824 21
Prince	.....	2,111,685 03	30,000 00	2,141,685 03
Revelsto	.....	572,800 00	.....	572,800 00
Rosslan	.....	181,000 00	15,028 51	196,028 51
Salmon	8,000 00	159,900 00	8,144 00	168,044 00
Slocan	.....	3,600 00	506 47	4,106 47
Trail .	.....	339,300 00	24,176 54	363,476 54
Vancouv	.....	35,587,327 71	2,259,341 55§	37,846,669 26
Vernon	.....	894,963 28	8,455 66	903,418 94
Victoria	50,000 00	17,855,682 03	1,737,131 24‖	19,592,813 27
T	$ 83,000 00	$73,653,322 14	$ 4,927,718 18	$ 78,581,040 32

Burnaby	.....	$ 2,126,717 24	$ 278,977 05	$ 2,405,694 29
Chilliwh	.....	54,833 33	15,000 00	69,833 33
Coldstre	.....	126,000 00	3,000 00	129,000 00
Coquitla	.....	101,675 42	.....	101,675 42
Delta .	.....	426,217 39	1,885 00	428,102 39
Esquima	.....	451,500 00	5,086 42	456,586 42
Fraser	.....	.....	3,800 00	3,800 00
Kent .	.....	20,000 00	215 00	20,215 00
Langley	.....	10,500 00	11,794 96	22,294 96
Maple R	.....	.....	4,084 59	4,084 59
Matsqui	.....	2,000 00	10,000 00	12,000 00
Mission	.....	.....	3,200 00	3,200 00
North C	.....	35,000 00	248 46	35,248 46
North V	.....	1,440,222 40	58,061 40	1,498,283 80
Oak Ba	.....	1,313,382 91	40,424 90	1,353,807 81
Peachla	.....	40,500 00	7,001 87	47,501 87
Pentictc	.....	1,045,700 00	50,819 00¶	1,096,519 00
Pitt Me	.....	.....	831 07	831 07
Point G	.....	6,360,954 98	123,380 48	6,484,335 46
Richmo	.....	773,921 50	9,658 66	783,580 16
Saanich	.....	1,246,145 31	25,214 53	1,271,359 84
Salmon	$ 10,000 00	42,600 00	17,242 67	59,842 67
South V	30,000 00	6,821,065 21	1,585,559 83x	8,406,625 04
Spallum	.....	103,226 00	1,150 00	104,376 00
Sumas	.....	.....	1,042 34	1,042 34
Summer	.....	458,000 00	.....	458,000 00
Surrey	.....	28,706 00	42,087 13	70,787 13
West V	.....	813,800 00	29,700 00	843,500 00
T	$ 40,000 00	$23,842,661 69	$ 2,329,465 36	$ 26,172,127 05
C	83,000 00	73,653,322 14	4,927,718 18	78,581,040 32
C	$ 123,000 00	$97,495,983 83	$ 7,257,183 54	$104,753,167 37

* "serve fund, $1,053,401.46 on hand for redemption of treasury notes.
‖ In debentures.

Municipality.	Debentures.											Sundry Outstanding Debts Exclusive of Shortage in Sinking Fund.	Grand Total.
	Schools.	Streets and Bridges.	Other Non-revenue producing.	Waterworks.	Electric Light.	Sewers (Revenue-producing).	Other Revenue-producing.	Local Improvements.	Better Housing.	Unemployment Relief.	Total Debenture Debt.		
Alberni	.....	.....	$ 8,000 00	$ 52,130 00	$ 10,000 00	.....	.....	.....	.....	.....	$ 70,130 00	$ 2,462 63	$ 72,592 63
Armstrong	$ 38,500 00	$ 4,000 00	19,100 00	41,000 00	79,250 00	.....	.....	$ 7,600 61	.....	.....	189,450 61	6,486 37	195,936 98
Chilliwack	29,000 00	75,500 00	83,000 00	.....	.....	.....	.....	66,045 29	.....	.....	253,545 29	.....	253,545 29
Courtenay	30,000 00	.....	.....	110,000 00	39,900 00	.....	.....	.....	$ 35,000 00	.....	214,900 00	13,407 66	228,307 66
Cranbrook	21,653 45	15,161 00	108,995 05	145,306 90	60,000 00	.....	.....	.....	15,000 00	.....	366,116 40	18,745 36	384,861 76
Cumberland	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Duncan	18,500 00	10,000 00	13,000 00	25,000 00	64,500 00	.....	.....	14,600 00	3,500 00	.....	149,100 00	824 08	149,924 08
Enderby	27,500 00	.....	21,500 00	22,500 00	.....	.....	.....	18,500 00	.....	.....	90,000 00	2,500 00	92,500 00
Fernie	45,000 00	5,000 00	83,160 72	119,000 00	74,000 00	$ 67,000 00	.....	.....	.....	.....	393,160 72	407 15	393,567 87
Grand Forks	.....	8,000 00	59,000 00	30,800 00	.....	.....	.....	.....	.....	.....	97,800 00	.....	97,800 00
Greenwood	.....	.....	58,072 25*	.....	.....	.....	.....	.....	.....	.....	58,072 25	.....	58,072 25
Kamloops	116,500 00	15,000 00	110,500 00	303,500 00	197,500 00	60,000 00	$ 306,500 00	56,650 00	73,350 00	.....	1,239,500 00	22,140 78	1,261,640 78
Kaslo	15,500 00	.....	.....	1,500 00	31,000 00	.....	.....	.....	.....	.....	48,000 00	.....	48,000 00
Kelowna	61,500 00	15,500 00	150,000 00	.....	.....	.....	155,500 00‡	51,309 00	31,916 13	.....	465,725 13	5,307 55	471,032 68
Ladysmith	.....	.....	.....	.....	25,000 00	60,000 00	.....	11,477 25	.....	.....	96,477 25	7,021 45	103,498 70
Merritt	24,000 00	10,000 00	20,000 00	45,000 00	25,000 00	.....	.....	.....	.....	.....	124,000 00	.....	124,000 00
Nanaimo	53,400 00	50,000 00	36,000 00	320,000 00	.....	205,000 00	.....	309,024 87	54,000 00	.....	1,027,424 87	.....	1,027,424 87
Nelson	75,000 00	.....	50,000 00	7,500 00	285,600 00	7,500 00	131,000 00	23,633 23	12,000 00	.....	591,633 23	19,959 26	611,592 49
New Westminster	414,000 00	1,294,000 00	1,698,027 00	916,500 00	206,000 00	.....	.....	1,363,925 84	85,000 00	$ 25,000 00	6,002,452 84	159,731 29	6,162,184 13
North Vancouver	430,030 00	246,500 00	572,669 00	526,000 00	.....	.....	.....	935,525 00	93,801 50	.....	3,042,525 50	361,695 98	3,404,221 48
Port Alberni	.....	20,000 00	.....	170,000 00	40,000 00	.....	.....	.....	15,800 00	.....	245,800 00	3,109 85	248,909 85
Port Coquitlam	35,000 00	237,500 00	194,000 00	100,000 00	.....	.....	.....	.....	16,450 00	.....	582,950 00	63,929 89	646,879 89
Port Moody	.....	.....	43,000 00	80,000 00	.....	.....	.....	50,300 00	.....	.....	173,300 00	126,380 70‡	299,680 70
Prince George	60,000 00	64,000 00	33,000 00	115,000 00	79,000 00	.....	.....	.....	74,000 00	.....	425,000 00	30,824 21	455,824 21
Prince Rupert	205,591 50	.....	182,535 85	477,956 44	275,845 55	.....	80,315 25	772,440 44	117,000 00	.....	2,111,685 03	30,000 00	2,141,685 03
Revelstoke	42,000 00	54,800 00	34,000 00	75,000 00	215,000 00	.....	.....	152,000 00	.....	.....	572,800 00	.....	572,800 00
Rossland	30,000 00	52,500 00	52,000 00	46,500 00	.....	.....	.....	.....	.....	.....	181,000 00	15,028 51	196,028 51
Salmon Arm	13,000 00	.....	8,500 00	85,000 00	42,000 00	.....	.....	.....	3,400 00	8,000 00	159,900 00	8,144 00	168,044 00
Slocan	.....	.....	3,600 00	.....	.....	.....	.....	.....	.....	.....	3,600 00	506 47	4,106 47
Trail	94,500 00	15,500 00	5,000 00	133,900 00	.....	.....	.....	65,500 00	24,900 00	.....	339,300 00	24,176 54	363,476 54
Vancouver	4,146,900 00	7,242,000 00	9,544,800 00	4,749,351 20	.....	.....	.....	9,624,670 51	279,000 00	.....	35,587,327 71	2,259,341 55§	37,846,669 26
Vernon	47,500 00	65,800 00	101,500 00	240,000 00	189,000 00	.....	.....	223,963 28	27,200 00	.....	894,963 28	8,455 66	903,418 94
Victoria	1,391,928 75	581,000 00	1,782,713 44	4,131,643 10	.....	2,317,792 81	.....	7,424,603 93	176,000 00	50,000 00	17,855,682 03	1,737,131 24‖	19,592,813 27
Totals	$ 7,466,503 70	$10,082,361 00	$15,075,673 31	$13,070,087 64	$ 1,937,995 55	$ 2,717,292 81	$ 911,315 25	$21,171,775 25	$ 1,137,317 63	$ 83,000 00	$73,653,322 14	$ 4,927,718 18	$ 78,581,040 32

Districts.

Burnaby	$ 325,100 25	$ 1,094,500 22	$ 70,000 00	$ 602,816 77	.....	.....	.....	.....	$ 34,300 00	.....	$ 2,126,717 24	$ 278,977 05	$ 2,405,694 29
Chilliwhack	39,833 33	.....	.....	.....	.....	.....	$ 15,000 00	.....	.....	.....	54,833 33	15,000 00	69,833 33
Coldstream	.....	6,000 00	.....	120,000 00	.....	.....	.....	.....	.....	.....	126,000 00	3,000 00	129,000 00
Coquitlam	.....	82,500 00	.....	.....	.....	.....	.....	$ 19,175 42	.....	.....	101,675 42	.....	101,675 42
Delta	.....	100,000 00	15,000 00	205,000 40	.....	.....	.....	106,216 99	.....	.....	426,217 39	1,885 00	428,102 39
Esquimalt	27,500 00	.....	.....	.....	.....	$ 400,000 00	.....	.....	24,000 00	.....	451,500 00	5,086 42	456,586 42
Fraser Mills	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,800 00	3,800 00
Kent	.....	.....	.....	.....	.....	.....	.....	20,000 00	.....	.....	20,000 00	215 00	20,215 00
Langley	.....	.....	.....	.....	.....	.....	.....	.....	10,500 00	.....	10,500 00	11,794 96	22,294 96
Maple Ridge	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4,084 59	4,084 59
Matsqui	.....	.....	.....	.....	.....	.....	.....	.....	2,000 00	.....	2,000 00	10,000 00	12,000 00
Mission	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,200 00	3,200 00
North Cowichan	.....	35,000 00	.....	.....	.....	.....	.....	.....	.....	.....	35,000 00	248 46	35,248 46
North Vancouver	103,000 00	507,243 00	422,757 00	194,725 00	.....	.....	.....	129,097 40	83,400 00	.....	1,440,222 40	58,061 40	1,498,283 80
Oak Bay	113,000 00	.....	102,400 00	200,000 00	.....	425,000 00	.....	444,732 91	28,250 00	.....	1,313,382 91	40,424 90	1,353,807 81
Peachland	1,000 00	5,200 00	6,000 00	9,500 00	$ 18,800 00	.....	.....	.....	.....	.....	40,500 00	7,001 87	47,501 87
Penticton	167,700 00	42,600 00	32,000 00	238,000 00	192,000 00	.....	342,000 00	10,500 00	21,500 00	.....	1,045,700 00	50,819 00¶	1,096,519 00
Pitt Meadows	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	831 07	831 07
Point Grey	938,262 16	1,987,935 15	300,506 66	1,443,998 40	.....	1,596,352 61	.....	2,900 00	91,000 00	.....	6,360,954 98	123,380 48	6,484,335 46
Richmond	28,000 00	299,400 00	.....	365,000 00	.....	.....	.....	81,521 50	.....	.....	773,921 50	9,658 66	783,580 16
Saanich	33,500 00	450,000 00	23,000 00	599,400 00	.....	.....	.....	82,845 31	57,400 00	.....	1,246,145 31	25,214 53	1,271,359 84
Salmon Arm	11,500 00	11,100 00	10,000 00	.....	.....	.....	.....	.....	.....	$ 10,000 00	42,600 00	17,242 67	59,842 67
South Vancouver	1,002,644 10	3,436,186 40	450,000 00	1,013,050 00	.....	.....	.....	784,284 71	104,900 00	30,000 00	6,821,065 21	1,585,559 83x	8,406,625 04
Spallumcheen	35,000 00	.....	41,500 00	.....	.....	.....	.....	26,726 00	.....	.....	103,226 00	1,150 00	104,376 00
Sumas	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,042 34	1,042 34
Summerland	8,700 00	24,000 00	21,000 00	375,800 00	28,500 00	.....	.....	.....	.....	.....	458,000 00	.....	458,000 00
Surrey	28,700 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	28,700 00	42,087 13	70,787 13
West Vancouver	38,200 00	175,000 00	40,000 00	125,000 00	.....	.....	146,000 00	256,000 00	33,600 00	.....	813,800 00	29,700 00	843,500 00
Totals	$ 2,901,639 84	$ 8,256,064 77	$ 1,534,163 66	$ 5,492,290 57	$ 239,300 00	$ 2,421,352 61	$ 503,000 00	$ 1,964,000 24	$ 490,850 00	$ 40,000 00	$23,842,661 69	$ 2,329,465 36	$ 26,172,127 05
Cities forward	7,466,503 70	10,082,361 00	15,075,673 31	13,070,087 64	1,937,995 55	2,717,292 81	911,315 25	21,171,775 25	1,137,317 63	83,000 00	73,653,322 14	4,927,718 18	78,581,040 32
Cities and districts	$10,368,143 54	$18,338,425 77	$16,609,836 97	$18,562,378 21	$ 2,177,295 55	$ 5,138,645 42	$ 1,414,315 25	$23,135,775 49	$ 1,628,167 63	$ 123,000 00	$97,495,983 83	$ 7,257,183 54	$104,753,167 37

* "City of Greenwood Relief Act, 1921" (Second Session). † Waterworks and electric light combined. ‡ Includes contingent liability, Port Moody Steel Works, $100,000. § Reserve fund, $1,053,401.40 on hand for redemption of treasury notes.
‖ Includes treasury certificates, $1,175,000, against hypothecated debentures. ¶ $40,000 borrowed against hypothecated debentures. x Includes $790,000 borrowed against hypothecated debentures.

IV.—SINKING FUNDS AS OF DECEMBER 31st, 1921.

Cities.

Municipality.	Cash.	Invested.	Total.	Sinking Fund required.	Short.	Over.	Condition at End of Previous Year.	
							Short.	Over.
Alberni	$ 4,715 77	$ 26,117 92	$ 30,833 69	$ 28,940 65	.....	$ 1,893 04	.....	$ 1,826 76
Armstrong	2,481 19	45,363 58	47,844 77	53,596 48	$ 5,751 71	.....	$ 7,788 15	.....
Chilliwack	239 57	41,039 54	41,279 11	40,057 70	.....	1,221 41	.....	368 71
Courtenay	3,058 40	1,000 00	4,058 40	4,058 40	.....	.....	405 43	.....
Cranbrook	377 91	48,574 26	48,952 17	43,070 39	.....	5,881 78	.....	156 29
Cumberland	.....	.....	.....	.....	.....	.....	.....	.....
Duncan	4,365 33	42,000 00	46,365 33	45,925 58	.....	439 75	343 75	.....
Enderby	2,038 96	14,000 00	16,038 96	28,992 86	12,953 90	.....	14,116 99	.....
Fernie	14,369 52	107,865 80	122,235 32	118,762 90	.....	3,472 42	.....	2,508 44
Grand Forks	11,425 38	1,489 10	12,914 48	32,312 77	19,398 29	.....	23,350 46	.....
Greenwood	.....	.....	.....	58,072 25*	.....	.....	49,414 00	.....
Kamloops	46,453 00	248,055 02	294,508 02	392,758 19	98,250 17	.....	84,161 90	.....
Kaslo	409 41	13,477 94	13,887 35	13,887 35	.....	.....	.....	.....
Kelowna	11,313 24	116,333 20	127,646 44	139,429 39	11,782 95	.....	39,733 83	.....
Ladysmith	6,463 50	29,333 06	35,796 56	38,190 10	2,393 54	.....	5,665 98	.....
Merritt	2,104 99	33,339 38	35,444 37	35,431 50	.....	12 87	.....	34 84
Nanaimo	105,462 23	196,990 00	302,452 23	302,452 23	.....	.....	.....	.....
Nelson	38,940 11	302,146 72	341,086 83	338,494 98	.....	2,591 85	15,733 22	.....
New Westminster	227 92	874,649 91	874,877 83	963,144 92	88,267 09	.....	181,557 53	.....
North Vancouver	23,076 59	574,614 39	597,690 98	597,690 98	.....	.....	.....	11,081 77
Port Alberni	7,471 07	44,984 36	52,455 43	51,157 13	.....	1,298 30	1,864 22†	.....
Port Coquitlam	42,097 16	7,000 00	49,097 16	101,650 73	52,553 57	.....	43,231 35	.....
Port Moody	2,139 94	33,604 14	35,744 08	35,445 76	.....	298 32	.....	3,464 02
Prince George	1,295 53	64,876 47	66,172 00	78,533 40	12,361 40	.....	5,385 22	.....
Prince Rupert	652 62	38,800 00	39,452 62	35,069 46	.....	4,383 16	.....	.....
Revelstoke	16,851 24	115,000 00	131,851 24	123,114 26	.....	8,736 98	.....	264 19
Rossland	28,040 26	83,275 57	111,315 83	111,315 83	.....	.....	11,409 61	.....
Salmon Arm	7,508 29	18,700 00	26,208 29	29,290 83	3,082 54	.....	6,177 66	.....
Slocan	.....	.....	.....	.....	.....	.....	.....	.....
Trail	628 84	39,476 06	40,104 90	39,361 33	.....	743 57	.....	183 37
Vancouver	745,017 36	7,887,977 26	8,632,994 62	10,236,829 38	1,603,834 76	.....	1,765,330 99	.....
Vernon	101,988 76	209,600 00	311,588 76	332,128 79	20,540 03	.....	62,217 76	.....
Victoria	365,034 31	1,329,550 00	1,694,584 31	4,842,091 35	3,147,507 04	.....	2,819,554 12	.....
Totals	$1,596,248 40	$12,589,233 68	$14,185,482 08	$19,291,257 87	$5,078,676 99	$ 30,973 45	$5,137,442 17	$ 19,888 39

* Sinking funds were all applied on debenture debt in accordance with the provisions of the "City of Greenwood Relief Act, 1921" (Second Session).

† $3,900, invested in municipal building-site.

IV.—SINKING FUNDS AS OF DECEMBER 31ST, 1921—*Continued.*

DISTRICTS.

Municipality.	Cash.	Invested.	Total.	Sinking Fund required.	Short.	Over.	Condition at End of Previous Year.	
							Short.	Over.
Burnaby	$ 72,651 61	$ 42,553 76	$ 115,205 37	$ 55,433 85	.....	$ 59,771 52	$ 21,792 13*	.....
Chilliwhack	.....	10,320 54	10,320 54	9,867 43	.....	453 11	.....	.....
Coldstream	3,844 25	29,700 00	33,544 25	27,755 03	.....	5,789 22	.....	$ 2,212 52
Coquitlam	2,798 69	23,100 00	25,898 69	25,751 25	.....	147 44	.....	199 13
Delta	13,632 07	58,000 00	71,632 07	67,834 23	.....	3,797 84	2,490 68	.....
Esquimalt	14,486 59	40,540 80	55,027 39	52,863 38	.....	2,164 01	.....	28,220 10
Fraser Mills	.....	.....	.....	.....	.....	.....	.....	.....
Kent	1,000 00	.....	1,000 00	744 31	.....	255 69	.....	.....
Langley	.....	.....	.....	.....	.....	.....	.....	.....
Maple Ridge	.....	.....	.....	.....	.....	.....	.....	.....
Matsqui	.....	.....	.....	.....	.....	.....	.....	.....
Mission	.....	.....	.....	.....	.....	.....	.....	.....
North Cowichan	171 58	5,150 00	5,321 58	5,166 79	.....	154 79	.....	99 13
North Vancouver	291 68	167,211 24	167,502 92	155,502 92	.....	12,000 00	.....	.....
Oak Bay	17,123 69	438,212 37	455,336 06	417,343 86	.....	37,992 20	.....	32,675 22
Peachland	89 55	10,650 00	10,739 55	14,657 18	$ 3,917 63	.....	3,508 52	.....
Penticton	22,321 58	78,800 00	101,121 58	103,294 65	2,173 07	.....	4,091 36	.....
Pitt Meadows	.....	.....	.....	.....	.....	.....	.....	.....
Point Grey	175,949 75	459,620 36	635,570 11	559,008 32	.....	76,561 79	.....	62,904 80
Richmond	6,913 17	113,916 76	120,829 93	109,021 77	.....	11,808 16	2,206 96	.....
Saanich	612 87	347,090 34	347,703 21	330,623 97	.....	17,079 24	.....	17,680 85
Salmon Arm	529 43	250 00	779 43	1,949 25	1,169 82	.....	368 06	.....
South Vancouver	18,893 26	391,269 09	410,162 35	803,422 64	393,260 29	.....	382,563 03	.....
Spallumcheen	7,715 85	30,697 56	38,413 41	34,559 92	.....	3,853 49	.....	6,088 97
Sumas	.....	.....	.....	.....	.....	.....	.....	.....
Summerland	11,084 05	74,900 00	85,984 05	88,576 32	2,592 27	.....	3,962 23	.....
Surrey	.....	.....	.....	.....	.....	.....	.....	.....
West Vancouver	11,656 41	92,088 93	103,745 34	124,621 88	20,876 54	.....	33,000 00	.....
Totals	$ 381,766 08	$ 2,414,071 75	$ 2,795,837 83	$ 2,987,998 95	$ 423,989 62	$231,828 50	$ 453,982 97	$150,080 72
Cities forward	1,596,248 40	12,589,233 68	14,185,482 08	19,291,257 87	5,078,676 99	30,973 45	5,137,442 17	19,888 39
Cities and districts	$1,978,014 48	$15,003,305 43	$16,981,319 91	$22,279,256 82	$5,502,666 61	$262,801 95	$5,591,425 14	$169,969 11

* Represented by mortgages foreclosed.

V.—ARREARS OF TAXES.

The following is a comparative statement of outstanding arrears of taxes, 1914–21:—

CITIES.

Municipality.	1914.	1915.	1916.	1917.	1918.	1919.	1920.	1921.
Alberni	$ 17,060 08	$ 23,258 85	$ 32,431 80	$ 39,677 75	$ 53,737 50	$ 21,805 84	$ 6,856 54	$ 11,797 19
Armstrong	9,863 12	13,574 60	16,553 32	18,733 44	18,404 24	7,568 84	3,186 49	4,338 47
Chilliwack	24,239 91	43,131 68	27,572 73	27,634 87	23,131 73	13,463 33	8,538 98	11,694 30
Courtenay	.....	3,231 49	7,004 24	8,082 36	9,412 56	10,090 04	5,798 17	6,705 83
Cranbrook	28,245 71	46,951 89	50,021 36	35,437 21	31,523 31	28,265 30	28,198 05	19,208 40
Cumerland	3,331 55	11,024 76	14,745 12	13,629 39	12,654 25	1,970 79	1,392 25	1,070 67
Duncan	4,399 10	6,608 76	10,545 67	12,019 04	11,998 44	9,336 78	8,527 80	5,990 27
Enderby	11,210 80	9,372 40	9,323 02	7,341 76	8,628 97	8,863 68	9,451 71	10,532 45
Fernie	21,363 20	44,286 43	50,946 07	25,948 00	65,741 07	24,471 78	14,362 92	14,045 53
Grand Forks	26,925 59	37,462 47	51,039 03	41,652 41	47,877 33	25,660 15	13,697 10	10,968 42
Greenwood	12,702 50	16,938 65	21,251 00	27,361 85	30,773 92	35,538 92	42,339 11	6,647 12
Kamloops	49,177 30	84,288 62	123,533 10	117,701 81	119,385 81	86,025 85	65,576 28	53,969 23
Kaslo	7,248 80	8,100 04	8,698 63	9,471 74	4,132 05	4,123 69	3,046 84	2,907 84
Kelowna	54,627 34	56,350 47	64,048 70	45,524 16	38,217 89	32,173 33	16,675 18	15,894 45
Ladysmith	6,331 45	15,234 35	22,213 10	23,739 25	18,544 00	16,001 75	31,793 42	9,025 04
Merritt	29,038 76	37,007 34	42,701 86	48,284 22	20,640 54	21,008 53	11,161 92	11,228 67
Nanaimo	47,343 70	85,795 60	119,868 41	145,099 81	163,150 87	137,071 38	80,295 08	84,849 18
Nelson	64,590 44	73,140 81	78,240 05	77,262 72	87,402 22	33,464 82	35,502 78	26,881 56
New Westminster	237,801 07	384,731 67	481,065 77	428,354 46	360,432 80	294,815 98	188,684 88	119,460 80
North Vancouver	256,943 22	363,707 73	439,054 32	511,244 67	570,896 88	342,980 56	247,830 59	157,613 78
Phoenix	3,037 00	3,277 75	3,516 56	4,366 94	6,275 86	8,209 17	.....	.....
Port Alberni	21,319 94	28,048 65	35,069 42	41,776 59	51,109 32	12,942 06	6,335 57	7,236 72
Port Coquitlam	118,219 33	132,866 96	144,719 31	172,223 26	201,267 75	135,713 89	62,213 44	59,163 97
Port Moody	19,266 46	44,196 52	42,309 45	57,067 98	75,045 55	33,316 54	20,395 77	18,135 08
Prince George	.....	40,803 09	97,685 91	145,558 29	170,697 27	70,175 26	69,002 10	76,552 10
Prince Rupert	149,428 67	177,524 17	117,380 10	204,040 65	196,250 18	172,741 78	184,610 96	174,987 72
Revelstoke	43,576 99	74,123 61	75,710 54	50,930 98	43,512 83	41,813 62	30,189 73	25,264 75
Rossland	17,924 09	14,926 25	16,104 20	19,242 90	22,934 85	17,907 40	12,411 55	13,803 35
Salmon Arm	12,123 50	11,488 08	16,268 24	11,032 07	11,923 10	9,199 64	7,897 25	5,223 55
Sandon	18,286 65	439 67	640 58	504 42	216 23	.....	.....	.....
Slocan	4,052 31	5,283 51	6,392 56	7,290 39	5,449 02	5,936 24	5,948 76	5,926 04
Trail	3,283 41	3,018 81	4,727 00	4,690 32	10,168 01	8,068 65	5,742 61	7,314 44
Vancouver	1,863,985 08	3,137,423 73	4,219,211 33	5,043,110 92	5,456,453 11	5,216,455 66	3,817,632 90	2,900,902 60
Vernon	84,325 31	119,138 56	121,866 34	161,995 09	174,945 79	148,108 24	127,083 22	107,157 40
Victoria	708,503 55	1,688,983 31	2,332,377 85	3,057,619 84	3,428,632 54	2,960,911 20	1,919,852 59	1,616,628 73
Totals	$3,879,775 92	$6,845,741 28	$ 8,964,834 69	$10,642,651 56	$11,551,567 79	$ 9,996,200 69	$7,092,252 54	$5,603,125 65

V.—ARREARS OF TAXES—*Continued.*

DISTRICTS.

Municipality.	1914.	1915.	1916.	1917.	1918.	1919.	1920.	1921.
Burnaby	$ 404,669 10	$ 556,647 42	$ 593,132 46	$ 564,593 43	$ 496,024 79	$ 301,081 84	$ 136,998 75	$ 141,696 78
Chilliwhack	16,854 11	20,875 44	20,579 83	27,158 14	11,351 60	8,313 70	20,521 42	25,520 02
Coldstream	10,678 13	11,813 43	12,626 35	14,675 11	8,232 91	2,444 02	6,244 46	6,651 77
Coquitlam	47,744 19	37,783 19	44,886 05	54,644 32	88,735 33	69,155 66	19,881 87	9,426 85
Delta	18,722 26	15,929 80	24,223 91	16,182 46	15,857 18	12,959 75	5,605 81	9,607 27
Esquimalt	10,826 50	18,022 63	22,282 24	27,644 72	33,037 28	29,504 14	19,346 65	17,962 86
Fraser Mills	1 90	.....	.....	.....	.....	.....	.....	.....
Kent	5,182 30	8,363 92	8,889 00	7,773 90	7,143 64	2,645 08	2,142 49	7,962 25
Langley	33,707 76	35,306 33	35,397 42	41,212 17	27,044 18	19,858 51	15,583 14	19,698 94
Maple Ridge	21,610 26	23,995 22	23,593 17	24,203 75	23,678 66	6,968 42	9,710 39	14,105 54
Matsqui	25,365 61	31,380 08	21,957 50	19,532 50	19,140 54	11,928 24	12,292 51	20,897 94
Mission	11,497 55	20,546 50	30,080 20	37,022 22	23,471 35	15,564 10	14,113 53	16,054 48
North Cowichan	10,427 05	15,273 90	18,205 22	15,031 97	20,016 72	16,307 14	19,896 54	22,271 84
North Vancouver	195,410 22	217,653 53	212,410 91	252,532 30	202,866 97	221,337 34	137,732 03	112,181 28
Oak Bay	60,132 49	110,684 27	156,376 09	131,482 78	123,037 28	89,981 36	52,025 70	37,843 35
Peachland	5,224 27	7,124 31	5,414 39	5,343 08	4,006 39	5,300 29	2,953 22	4,045 32
Penticton	38,892 85	44,441 66	46,938 42	55,757 78	43,412 05	35,708 76	34,537 86	27,294 25
Pitt Meadows	933 86	4,921 19	8,957 81	10,604 30	10,325 57	1,115 29	4,454 52	6,246 97
Point Grey	305,536 30	332,473 28	405,797 85	357,493 58	417,869 92	346,042 11	236,031 04	233,149 34
Richmond	65,978 50	83,210 25	94,109 12	79,789 41	69,477 19	64,493 28	50,735 67	63,008 21
Saanich	82,069 69	88,345 58	111,132 28	134,813 06	105,184 36	100,303 88	68,301 41	66,430 71
Salmon Arm	10,624 49	9,057 69	7,871 00	9,665 90	10,521 85	9,012 72	12,634 72	13,530 72
South Vancouver	553,740 13	581,252 54	718,297 58	888,244 34	1,113,877 42	550,547 07	300,298 15	321,575 23
Spallumcheen	25,663 49	36,957 90	38,872 06	38,656 80	39,340 14	24,450 81	17,134 33	10,462 28
Sumas	3,590 80	6,007 30	7,269 58	5,390 53	3,637 82	1,459 00	1,778 93	2,165 21
Summerland	16,361 89	19,878 32	22,539 15	20,449 64	20,154 33	17,752 03	12,816 60	14,462 31
Surrey	61,159 53	77,167 28	73,295 28	58,098 41	46,292 24	39,856 35	23,454 94	28,089 84
West Vancouver	71,849 27	105,521 70	125,807 94	139,479 44	95,911 15	93,829 59	103,587 15	108,697 65
Totals	$2,114,454 50	$2,520,634 66	$ 2,890,942 81	$ 3,037,476 04	$ 3,079,648 86	$ 2,097,920 68	$1,340,814 03	$1,361,039 21
Cities forward	3,879,775 92	6,845,741 28	8,964,834 69	10,642,651 56	11,551,567 79	9,996,200 69	7,092,252 54	5,603,125 65
Cities and districts..	$5,994,230 42	$9,366,375 94	$11,855,777 50	$13,680,127 60	$14,631,216 65	$12,094,121 37	$8,433,066 57	$6,964,164 86

Municipality.	Land-taxes received.	Trades Licences	Road-taxes.	Poll-tax.	Dog-tax.	Fines.	Government Grant for Schools.	Government Grant from Liquor Profits.	Better Housing	Receipts from Public Utilities.	Sundry Receipts.	Total.
Alberni	$ 13,374 02	$ 377 34	$ 18 00	$ 30 00	$ 14 00	.....	$ 2,118 75	$ 294 13	.....	$ 4,530 47	$ 1,747 83	$ 22,504 54
Armstrong	27,242 16	1,557 00	209 50	321 00	59 00	$ 539 50	5,564 68	705 89	.....	24,176 14	1,636 94	62,011 81
Chilliwack	55,334 81	1,962 50	227 60	.....	264 85	817 25	8,625 00	911 76	.....	.....	13,196 21	81,339 38
Courtenay	20,635 04	1,269 00	.....	225 00	63 00	470 00	3,013 35	470 60	$ 2,533 41	15,132 35	2,753 52	46,565 27
Cranbrook	70,034 94	4,636 00	.....	.....	130 85	3,878 80	11,353 35	1,764 70	15,500 00	62,529 91	2,596 66	172,425 21
Cumberland	14,137 82	1,985 00	354 00	5,123 00	34 00	1,604 50	16,003 78	705 89	1,197 30	.....	4,407 70	45,612 99
Duncan	27,972 44	2,297 50	282 00	215 00	198 00	610 60	14,732 72*	705 89	276 29	21,606 00	3,303 42	72,199 86
Enderby	24,014 00	497 50	230 00	.....	48 00	304 40	4,211 89	558 83	.....	3,579 58	525 57	33,969 77
Fernie	76,197 13	7,575 00	1,555 00	3,188 92	653 50	5,927 50	17,381 00	2,352 94	.....	61,977 73	11,100 20	187,908 92
Grand Forks	43,399 68	1,943 00	96 00	.....	86 00	651 00	7,359 66	1,176 47	.....	24,679 22	10,962 13	90,353 16
Greenwood	9,447 12	335 00	.....	.....	24 00	.....	3,760 00	352 95	.....	1,924 40	6,593 99	22,437 46
Kamloops	146,987 68	4,279 50	932 00	.....	366 00	4,376 00	11,277 45	2,352 94	21,227 77	199,298 38	12,902 14	403,999 86
Kaslo	15,108 12	620 00	4 00	125 60	117 60	64 00	4,290 00	441 18	.....	14,388 16	1,807 06	36,960 52
Kelowna	99,118 68	3,102 00	718 00	1,962 45	200 00	2,550 25	9,997 35	1,470 59	9,104 38	64,862 79	16,102 14	209,188 63
Ladysmith	35,832 64	3,455 40	360 00	.....	186 00	679 00	10,773 50	1,647 06	.....	20,030 98	2,999 04	75,963 62
Merritt	24,620 76	2,770 00	156 00	.....	312 50	3,110 70	5,208 00	588 24	.....	26,189 26	6,666 88	69,622 34
Nanaimo	159,988 14	10,240 00	2,028 00	.....	301 00	7,461 00	18,191 45	4,705 88	30,281 64	37,052 46	10,258 77	280,508 34
Nelson	134,495 81	5,950 00	1,064 00	2,400 00	527 03	2,296 20	24,627 56	2,941 17	218 88	142,026 69	23,992 16	340,539 50
New Westminster	443,468 24	10,406 02	1,524 00	5,355 00	.....	9,076 80	44,883 50	8,235 29	29,628 99	192,553 53	156,054 31	901,785 68
North Vancouver	298,648 02	5,421 50	.....	4,715 00	895 25	2,853 21	23,616 70	4,705 88	38,697 62	300,140 97	6,372 78	686,066 93
Port Alberni	35,536 67	892 24	838 50	1,654 18	104 00	252 50	4,934 49	441 18	374 82	18,293 02	3,125 23	66,446 83
Port Coquitlam	54,222 87	997 50	224 00	605 00	104 00	625 75	5,414 60	705 89	9,382 85	4,426 15	18,701 28	95,409 89
Port Moody	43,307 21	609 50	492 00	1,315 00	121 00	512 70	3,916 85	882 35	.....	5,505 65	6,225 89	62,888 15
Prince George	73,348 72	6,898 00	52 00	106 00	179 00	6,821 50	5,697 10	882 35	27,505 38	39,618 96	3,905 23	165,014 24
Prince Rupert	345,850 43	10,315 00	2,009 40	1,311 10	319 00	10,768 85	12,653 35	2,352 94	177 54	174,431 48	4,002 01	564,191 10
Revelstoke	91,871 72	1,666 75	916 60	.....	324 25	2,582 00	9,836 65	2,058 82	.....	52,613 45	4,570 09	166,434 33
Rossland	31,899 89	2,194 90	294 00	810 00	203 00	815 00	10,400 00	1,588 23	.....	9,897 40	15,969 49	74,071 91
Salmon Arm	24,049 79	1,098 75	138 00	.....	30 00	280 00	3,390 00	352 95	357 50	10,711 29	8,185 50	48,593 87
Slocan	2,976 91	83 50	.....	36 32	.....	.....	2,118 75	176 48	168 53	590 47	6,150 96	
Trail	71,117 53	4,431 50	922 00	4,883 82	195 00	2,615 30	11,613 35	1,176 48	1,059 42	17,627 15	2,263 91	117,905 46
Vancouver	6,038,909 24	265,720 65	.....	.....	3,862 25	162,931 64	260,289 20	64,705 88	.....	505,407 36	256,388 40	7,558,214 62
Vernon	174,526 22	3,763 00	598 00	900 00	231 00	2,171 00	15,340 00	1,764 70	8,574 24	81,058 51	17,753 43	306,680 10
Victoria	1,897,825 22	69,305 95	6,970 00	.....	3,807 00	16,202 28	93,035 55	20,588 23	56,036 41	271,655 35	312,372 02	2,748,998 01
Totals	$10,625,499 67	$438,656 50	$ 23,206 00	$ 35,281 79	$ 13,959 48	$253,845 23	$ 686,229 58	$134,764 76	$252,734 44	$2,408,093 32	$ 950,692 49	$15,822,963 26

* Consolidated school district.

DISTRICTS.

Burnaby	$ 418,240 26	$ 3,615 00	$ 270 00	$ 894 77	$ 1,135 50	$ 6,000 80	$ 40,426 00	$ 5,588 23	$ 18,213 81	$ 39,291 11	$ 145,915 99	$ 679,597 47
Chilliwhack	87,985 41	570 00	639 50	681 25	.....	1,749 00	22,133 87	2,941 17	.....	.....	762 73	117,432 93
Coldstream	24,217 47	.....	.....	1,350 00	.....	305 00	1,297 00	235 30	.....	1,956 68	1,184 22	30,545 67
Coquitlam	26,609 44	276 00	.....	1,566 34	34 50	648 23	4,060 00	705 89	.....	796 82	9,928 44	44,625 66
Delta	99,467 83	1,247 50	732 00	1,370 00	80 00	1,145 50	11,022 60	1,882 35	.....	11,932 19	7,656 95	136,536 92
Esquimalt	105,123 21	1,345 00	546 00	.....	478 09	1,460 09	12,514 60	2,647 05	9,778 87	.....	7,525 51	141,418 33
Fraser Mills	4,165 71	66 00	.....	1,970 00	6 00	.....	.....	529 42	.....	.....	45 12	6,782 25
Kent	21,603 70	415 00	.....	405 00	.....	615 50	4,618 74	411 77	.....	.....	2,858 94	31,018 65
Langley	62,213 60	328 50	584 00	1,227 69	.....	300 99	18,054 01	1,470 59	1,724 55	.....	9,465 89	95,435 82
Maple Ridge	52,368 14	2,104 57	924 50	1,308 50	.....	626 05	14,348 50	1,764 70	.....	.....	4,669 21	78,114 17
Matsqui	51,212 69	330 00	.....	1,909 68	.....	76 80	14,191 57	1,176 48	.....	.....	3,152 84	72,049 46
Mission	67,417 69	80 00	831 30	1,840 00	.....	175 00	14,084 00	1,470 59	.....	.....	5,272 13	91,170 71
North Cowichan	57,294 49	475 00	1,357 80	3,039 15	746 60	278 60	.....	1,764 70	.....	.....	2,199 82	67,155 56
North Vancouver	165,388 52	.....	656 34	335 00	405 50	2,465 59	10,614 00	2,058 82	17,463 75	10,325 02	124,368 52	334,081 06
Oak Bay	230,846 78	1,251 50	146 00	295 00	592 00	765 44	14,496 02	2,352 94	13,192 10	23,950 12	15,836 54	303,724 44
Peachland	11,653 21	165 00	.....	.....	55 00	124 75	3,190 00	323 53	.....	5,372 04	952 00	21,835 53
Penticton	109,698 71	3,757 75	.....	1,160 00	301 00	3,257 25	14,132 00	1,764 70	.....	84,436 02	22,800 54	241,307 97
Pitt Meadows	11,133 91	30 00	132 60	.....	.....	55 00	1,160 00	147 06	.....	.....	363 75	13,021 72
Point Grey	699,204 96	225 00	607 60	405 00	785 00	2,809 00	42,156 33	5,882 35	7,947 85	40,564 01	124,325 06	924,772 16
Richmond	144,054 06	2,434 50	2,937 50	5,875 00	231 00	3,474 15	15,219 38	1,882 35	.....	29,474 99	27,385 22	232,965 15
Saanich	260,310 81	330 00	1,376 00	.....	1,000 50	1,684 50	39,950 94	4,411 76	18,478 28	38,334 25	26,585 74	392,468 78
Salmon Arm	28,320 49	29 00	.....	.....	.....	20 00	4,226 00	2,058 82	.....	.....	9,560 85	44,215 16
South Vancouver	868,660 34	3,937 26	2,452 40	4,547 50	2,837 00	4,772 70	150,244 18	14,705 82	.....	91,079 57	154,440 40	1,297,677 37
Spallumcheen	51,639 23	.....	88 50	130 50	.....	.....	7,793 68	1,470 59	.....	.....	604 56	61,727 06
Sumas	19,038 75	.....	231 60	356 50	.....	.....	4,721 05	294 13	.....	.....	412 47	25,054 50
Summerland	56,826 12	607 50	.....	920 00	105 60	266 25	10,288 02	1,176 48	.....	43,185 47	10,146 70	123,519 14
Surrey	91,771 48	1,685 00	3,310 70	3,626 16	26 50	4,140 00	18,843 24	2,941 17	.....	.....	28,890 14	155,234 39
West Vancouver	98,559 33	770 25	.....	2,116 05	133 00	.....	6,126 12	1,176 48	39,009 01	83,189 90	23,510 07	254,590 21
Totals	$ 3,925,026 54	$ 26,075 33	$ 17,829 74	$ 37,448 49	$ 8,952 10	$ 37,279 19	$ 499,917 85	$ 65,235 24	$125,808 22	$ 503,688 19	$ 770,817 35	$ 6,018,078 24
Cities forward	10,625,499 67	438,656 50	23,206 00	35,281 79	13,959 48	253,845 23	686,229 58	134,764 76	252,734 44	2,408,093 32	950,692 49	15,822,963 26
Cities and districts	$14,550,526 21	$464,731 83	$ 41,035 74	$ 72,730 28	$ 22,911 58	$291,124 42	$1,186,147 43	$200,000 00	$378,542 66	$2,911,781 51	$1,721,509 84	$21,841,041 50

NOTE.—The figures submitted under the headings of "Receipts" and "Expenditures" are prepared very largely from an analysis of the auditors' reports, and although the classification of expenditures is not uniform in the different municipalities, and it is in many cases extremely difficult to make a distribution of the items, yet the statements have been prepared with a good deal of care and may be taken as substantially correct. Items which are of the nature of cross-entries, deposit accounts, and trust accounts, which would have the effect of inflating the figures, have as far as possible been eliminated.

rest on porary oans.	Donations and Grants.	Council Salaries.	Salaries and Office Expenses.	Public Utilities, including Interest and Sinking Fund.	Sundry Expenditures.	Total.
.....	.....	.....	$ 3,429 34	$ 11,922 18	$ 1,092 46	$ 23,795 83
966 73	$ 722 08	$ 700 00	2,417 41	24,024 45	9,403 81	67,078 55
216 47	267 50	700 00	3,854 22	.....	1,239 53	74,654 84
297 66	175 00	.....	3,213 80	12,227 90	3,555 10	45,237 49
639 99	960 00	.....	6,383 86	60,533 85	2,023 86	170,829 08
11 55	62 00	.....	2,363 92	.....	4,412 66	47,489 01
287 66	500 00	650 00	3,039 43	20,752 59	7,752 12	69,842 29
209 01	50 00	.....	2,590 50	4,372 77	909 48	30,457 97
178 97	230 85	500 00	5,498 96	46,191 26	14,984 77	165,284 07
286 57	482 00	1,000 00	4,481 96	18,220 11	14,076 77	83,175 30
162 72	.....	.....	1,761 44	2,978 11	12,870 94	31,424 11
405 45	5,931 91	2,300 00	9,620 65	200,323 77	30,193 42	408,119 01
27 54	130 00	.....	2,368 87	11,607 98	1,727 16	36,688 20
1,690 66	1,270 45	1,005 00	11,078 86	66,004 62	16,438 87	206,583 04
377 40	1,833 57	631 26	4,542 56	22,759 68	4,671 86	76,941 87
157 45	845 65	.....	1,762 50	28,713 36	5,190 39	72,508 85
1,632 98	717 20	2,789 96	10,931 04	37,687 01	18,606 72	274,443 50
823 96	789 00	1,200 00	14,073 60	106,805 31	29,634 02	306,356 59
1,959 62	7,705 48	4,800 00	22,611 80	145,886 01	123,359 37	986,146 32
2,729 57	2,340 50	2,988 70	22,735 32	291,212 94	31,432 52	748,898 46
312 46	.....	1,052 00	3,502 23	38,886 37	6,884 87	79,843 97
9,718 21	165 00	2,299 80	5,788 88	9,899 92	10,359 04	115,551 56
1,730 92	150 00	.....	4,385 39	7,016 10	24,813 70	72,306 75
6,628 75	1,040 00	2,198 50	12,888 41	52,378 14	11,589 60	182,031 34
9,084 32	3,728 00	3,900 00	28,676 35	164,779 55	42,949 80	536,461 08
1,177 83	882 25	500 00	7,554 26	45,098 55	12,701 03	148,955 31
466 37	127 80	617 00	3,825 24	7,100 17	4,691 64	83,636 54
338 87	497 85	.....	5,047 51	16,447 89	2,163 55	45,395 72
.....	.....	.....	600 15	7 50	645 14	6,543 32
727 54	315 00	1,200 00	9,165 47	13,892 52	10,205 19	119,907 30
7,396 86	93,985 01	14,600 00	187,336 71	563,392 62	526,232 29	7,509,204 38
2,554 82	4,438 93	.....	5,911 51	81,247 69	19,406 26	267,454 44
9,196 49	46,375 88	7,000 00	70,744 18	271,536 24	267,985 33	3,130,719 79
2,395 40	$ 176,718 91	$ 52,632 22	$ 484,186 33	$2,383,907 16	$1,274,403 27	$16,224,165 88

3,519 06	$ 800 44	$ 2,800 00	$ 35,013 41	$ 92,012 99	$ 74,367 43	$ 617,879 87
2,847 55	975 00	1,300 00	2,592 60	.....	33,002 44	123,306 14
568 83	497 50	.....	3,441 80	13,565 09	2,594 54	30,793 13
538 31	1,175 00	1,850 00	4,196 17	3,798 99	2,586 34	56,184 32
1,544 93	730 00	1,300 00	6,690 05	23,422 77	19,698 18	137,097 04
959 50	1,560 00	1,700 00	7,786 82	.....	16,007 12	146,036 00
.....	.....	.....	598 39	.....	.....	5,305 79
312 49	110 00	1,150 00	1,478 18	.....	6,796 43	32,978 99
743 90	875 00	1,700 00	6,425 51	.....	6,435 80	99,135 56
486 66	600 00	1,325 00	5,799 64	.....	8,282 65	76,389 54
1,334 91	458 60	1,500 00	3,285 95	.....	3,752 32	77,286 65
1,162 23	295 00	1,225 00	3,025 85	.....	5,089 75	77,783 25
278 20	655 00	747 05	4,196 94	.....	11,714 49	58,806 12
3,466 83	360 00	2,550 00	21,852 76	20,570 32	34,989 92	325,196 02
3,740 58	2,108 75	.....	11,987 40	26,829 45	46,139 55	299,480 73
710 27	.....	550 00	1,127 12	6,154 52	2,548 40	23,617 00
2,431 23	1,178 51	2,250 00	8,102 62	95,339 77	30,407 86	241,334 04
90 27	55 00	525 00	1,973 33	.....	3,335 50	16,939 95
8,723 01	2,633 15	3,100 00	31,397 64	128,264 02	129,023 26	991,818 59
2,036 97	580 00	2,500 00	8,643 63	39,263 94	26,217 61	232,669 78
4,174 71	2,749 10	2,000 00	21,371 69	51,694 27	36,906 40	438,425 67
627 52	436 25	1,125 00	3,064 84	.....	10,967 48	52,197 25
5,960 31	5,993 71	.....	66,400 65	151,713 47	126,717 61	1,553,107 41
546 08	775 00	1,000 00	2,318 43	3,837 89	7,764 96	64,343 20
79 68	200 00	800 00	1,900 22	.....	1,269 30	24,617 94
616 17	823 75	1,700 00	2,855 98	62,430 98	7,942 29	123,420 24
5,093 33	700 00	2,700 00	15,185 73	.....	21,794 78	168,128 92
482 42	557 50	2,000 00	12,106 45	109,224 43	15,748 14	275,714 72
3,069 95	$ 27,882 26	$ 39,397 05	$ 294,819 80	$ 828,122 90	$ 692,100 55	$ 6,366,993 86
2,395 40	176,718 91	52,632 22	484,186 33	2,383,907 16	1,274,403 27	16,224,165 88
5,465 35	$ 204,601 17	$ 92,029 27	$ 779,006 13	$3,212,030 06	$1,966,503 82	$22,591,159 74

Municipality.	Interest on Debentures, exclusive of Schools and Public Utilities.	Sinking Fund and instalments of Principal on Debentures, exclusive of Schools and Public Utilities	Roads and Streets.	Street-lighting.	Parks.	Sewers.	Fire-protection.	Hospitals.	Public Health.	Administration of Justice.	Schools, including Interest and Sinking Fund Payments.	Better Housing.	Interest on Temporary Loans.	Donations and Grants.	Council Salaries.	Salaries and Office Expenses.	Public Utilities, including Interest and Sinking Fund.	Sundry Expenditures.	Total.
Alberni	$ 380 00	$ 297 75	$ 1,154 29	$ 215 00	.....	.....	$ 348 77	.....	$ 75 00	$ 438 45	$ 4,442 49	.....	.....	.....	.....	$ 3,429 34	$ 11,922 18	$ 1,092 46	$ 23,795 83
Armstrong	1,847 04	1,255 52	3,375 71	2,500 00	$ 137 40	.....	.....	$ 272 50	189 55	1,709 70	17,556 65	.....	$ 986 73	$ 722 08	$ 700 00	2,417 41	24,024 45	9,403 81	67,078 55
Chilliwack	9,477 72	7,335 42	5,520 62	1,968 60	.....	$ 5,947 35	1,872 50	500 00	97 75	2,191 16	33,466 00	.....	216 47	267 50	700 00	3,854 22	.....	1,239 53	74,654 84
Courtenay	.....	.....	5,603 05	931 93	.....	.....	2,063 91	175 00	291 40	3,325 33	12,437 50	$ 939 91	297 66	175 00	.....	3,215 80	12,227 90	3,555 10	45,237 49
Cranbrook	8,302 98	4,538 44	8,787 63	2,609 15	.....	1,901 24	8,803 70	.....	915 33	8,855 77	45,262 03	10,311 25	639 99	960 00	.....	6,383 86	60,533 85	2,023 86	170,829 08
Cumberland	.....	.....	5,331 90	912 94	.....	2,232 56	343 20	230 39	200 00	2,639 88	25,364 50	3,383 51	11 55	62 00	.....	2,363 92	.....	4,412 66	47,489 01
Duncan	1,556 00	1,790 31	1,929 88	1,900 00	.....	.....	658 61	311 50	80 64	1,765 00	26,708 55	160 00	287 66	500 00	650 00	3,039 43	20,752 59	7,752 12	69,842 29
Enderby	2,399 92	1,343 29	3,218 24	803 84	41 62	.....	448 97	84 00	297 99	937 35	12,750 99	.....	209 01	50 00	.....	2,590 50	4,372 77	909 48	30,457 97
Fernie	7,639 33	3,994 98	8,424 02	2,781 63	211 03	1,115 00	5,212 86	.....	2,084 69	8,648 46	57,587 26	.....	178 97	230 85	500 00	5,498 96	46,191 26	14,984 77	165,284 07
Grand Forks	4,590 00	2,381 45	6,489 90	5 00	.....	.....	1,241 85	588 24	289 10	2,555 25	26,487 10	.....	286 57	482 00	1,000 00	4,481 96	18,220 11	14,076 77	83,175 30
Greenwood	4,333 90	596 25	1,402 23	.....	.....	.....	128 00	.....	.....	315 26	6,875 26	.....	162 72	.....	.....	1,761 44	2,978 11	12,870 94	31,424 11
Kamloops	12,717 66	10,281 96	24,453 11	6,800 00	3,561 47	452 64	12,550 96	4,176 47	678 80	13,581 15	55,332 78	14,756 81	405 45	5,931 91	2,300 00	9,620 65	260,323 77	50,193 42	408,119 01
Kaslo	.....	.....	3,129 57	1,200 00	125 00	.....	469 15	200 00	109 25	525 00	13,068 68	.....	27 54	130 00	.....	2,368 87	11,607 98	1,727 16	36,688 20
Kelowna	11,809 78	7,123 11	16,196 96	2,515 29	8,759 13	3,919 85	2,511 22	2,387 75	.....	6,184 19	42,044 39	5,642 91	1,660 66	1,270 45	1,005 00	11,078 86	66,004 62	16,438 87	206,583 04
Ladysmith	4,288 55	2,262 85	953 29	2,737 00	.....	9 00	663 38	49 95	100 00	4,214 76	26,846 76	.....	377 40	1,833 57	631 26	4,542 56	22,759 68	4,671 86	76,941 87
Merritt	1,500 00	1,616 63	3,583 18	5,800 00	10 50	.....	489 34	.....	125 75	5,206 53	17,507 57	.....	157 45	845 65	.....	1,762 50	28,713 36	5,190 39	72,508 85
Nanaimo	33,710 53	23,428 65	14,258 01	6,459 80	548 82	4,009 85	7,826 22	1,815 00	2,552 49	10,785 81	65,292 66	29,390 75	1,632 98	717 20	2,789 96	10,931 04	37,687 01	18,606 72	274,443 50
Nelson	3,831 79	4,027 73	22,110 66	8,000 00	1,423 35	1,010 33	12,053 07	6,398 25	1,874 43	7,779 46	84,502 55	218 88	823 96	789 00	1,200 00	14,073 60	196,805 31	29,634 02	396,556 59
New Westminster	176,849 45	66,978 44	76,815 62	4,958 79	8,063 86	2,000 79	54,772 33	14,634 15	6,561 73	23,913 33	215,007 72	19,067 83	11,959 62	7,705 48	4,800 00	22,611 80	145,886 01	123,559 37	986,146 32
North Vancouver	81,593 84	42,286 04	35,534 79	6,638 42	5,159 56	258 71	18,324 90	2,000 00	3,189 51	16,683 46	132,871 11	30,918 57	22,729 57	2,340 50	2,988 70	22,735 32	291,212 94	31,432 52	748,898 46
Port Alberni	1,200 00	1,168 73	7,382 70	3,000 00	.....	.....	5,265 61	500 00	89 80	2,075 89	7,991 99	531 32	312 46	.....	1,052 00	3,502 23	38,886 37	6,884 87	79,843 97
Port Coquitlam	24,990 00	11,926 42	8,033 86	1,445 50	.....	.....	4,053 05	500 50	174 00	1,878 79	16,364 45	7,954 14	9,718 21	165 00	2,299 80	5,788 88	9,899 92	10,359 04	115,551 56
Port Moody	5,598 00	4,152 80	5,853 46	1,026 00	.....	.....	658 32	805 30	302 12	2,361 99	13,452 65	.....	1,730 92	150 00	.....	4,385 39	7,016 10	24,813 70	72,306 75
Prince George	4,620 00	6,093 63	2,501 40	2,499 68	.....	.....	4,810 21	4,200 00	640 29	12,628 09	26,740 61	30,574 03	6,628 75	1,040 00	2,198 50	12,888 41	52,378 14	11,589 60	182,031 34
Prince Rupert	57,311 53	25,923 58	18,690 54	5,831 30	511 50	16,545 55	20,603 41	11,531 80	4,799 77	26,312 63	84,163 95	1,117 48	19,084 32	3,728 00	3,900 00	28,676 35	164,779 55	42,949 80	536,461 08
Revelstoke	16,107 88	9,346 28	1,369 96	834 86	202 03	1,181 41	2,581 06	1,029 41	535 50	6,319 04	41,533 36	.....	1,177 83	882 25	500 00	7,554 26	45,098 55	12,701 03	148,955 31
Rossland	5,370 00	5,962 02	6,297 80	2,054 05	.....	921 15	6,157 00	.....	420 00	4,011 59	35,014 71	.....	466 37	127 80	617 00	3,825 24	7,100 17	4,691 64	83,636 54
Salmon Arm	288 00	741 47	4,351 57	2,162 40	.....	.....	510 20	381 58	16 00	54 50	11,621 83	772 50	338 87	497 85	.....	5,047 51	16,447 89	2,163 55	45,395 72
Slocan	.....	600 00	52 60	.....	.....	.....	.....	.....	.....	.....	4,637 93	.....	.....	.....	.....	600 15	7 50	645 14	6,543 32
Trail	5,849 20	3,653 30	12,980 53	853 65	403 98	649 14	2,202 02	.....	120 00	4,292 98	52,363 77	1,023 01	727 54	315 00	1,200 00	9,165 47	13,892 52	10,205 10	119,907 30
Vancouver	1,115,650 90	759,102 15	744,901 43	87,610 27	97,963 77	122,134 51	450,209 09	259,040 79	71,274 41	573,479 74	1,704,803 23	.....	137,396 86	93,987 01	14,600 00	187,336 71	563,392 62	526,232 29	7,509,204 38
Vernon	20,277 26	13,381 80	12,820 97	7,500 00	891 19	1,703 95	8,865 66	3,825 00	1,272 17	7,935 00	64,032 74	11,389 49	2,554 82	4,438 93	.....	5,911 51	81,247 09	19,406 26	267,454 44
Victoria	554,563 55	601,762 91	185,552 67	47,602 22	30,309 02	27,958 23	152,930 94	36,027 18	10,915 68	110,726 47	905,083 44	75,449 36	59,106 49	46,375 88	7,000 00	70,744 18	271,536 24	267,985 33	3,130,719 79
Totals	$2,180,654 83	$1,625,353 91	$1,261,072 25	$ 222,157 32	$158,323 43	$193,951 26	$789,720 71	$351,664 76	$119,273 15	$ 874,332 01	$3,549,817 21	$ 243,601 75	$ 282,395 40	$ 176,718 91	$ 52,632 22	$ 484,186 33	$2,383,907 16	$1,274,403 27	$16,224,165 88
Districts.																			
Burnaby	$ 64,310 60	$ 30,704 60	$ 63,417 67	$ 12,853 78	.....	$ 11,380 61	.....	$ 7,143 50	$ 789 46	$ 22,991 66	$ 167,893 12	$ 17,882 74	$ 13,519 06	$ 809 44	$ 2,800 60	$ 35,013 41	$ 92,012 99	$ 74,367 43	$ 617,879 87
Chilliwhack	.....	.....	26,297 24	.....	.....	.....	$ 70 00	989 78	50 00	2,630 62	52,550 91	.....	2,847 55	975 00	1,300 00	2,592 60	.....	33,002 44	123,306 14
Coldstream	330 00	499 74	5,468 45	.....	.....	.....	.....	.....	.....	184 75	3,642 43	.....	568 83	497 50	.....	3,441 80	13,565 09	2,504 54	30,793 13
Coquitlam	4,200 00	1,337 63	22,464 15	553 92	.....	.....	172 47	795 00	85 00	2,288 34	10,143 00	.....	538 31	1,175 00	1,850 00	4,196 17	3,798 99	2,586 34	56,184 32
Delta	9,240 85	7,191 65	32,340 72	.....	.....	.....	.....	2,282 70	175 00	2,403 85	29,986 34	.....	1,544 93	730 00	1,300 00	6,690 05	23,422 77	19,698 18	137,097 04
Esquimalt	20,000 00	3,546 20	22,463 31	1,768 98	.....	3,567 27	2,019 50	.....	360 00	6,497 73	46,520 49	11,279 08	959 50	1,560 00	1,700 00	7,786 82	.....	16,007 12	146,036 00
Fraser Mills	.....	.....	1,820 00	240 00	.....	100 00	100 00	295 75	.....	1,344 35	807 30	.....	.....	.....	.....	598 39	.....	.....	5,305 79
Kent	600 00	744 31	7,957 66	.....	.....	.....	.....	205 88	.....	143 60	13,480 44	.....	312 49	110 00	1,150 00	1,478 18	.....	6,796 43	32,978 99
Langley	.....	.....	37,846 96	216 00	.....	558 78	.....	1,967 35	306 80	1,184 55	30,830 51	1,044 40	743 90	875 00	1,700 00	6,425 51	.....	6,435 80	99,135 56
Maple Ridge	.....	.....	18,437 44	693 00	.....	.....	.....	1,752 40	341 50	2,181 51	33,489 74	.....	486 66	600 00	1,325 00	5,709 64	.....	8,282 65	73,389 54
Matsqui	.....	.....	28,177 08	.....	.....	.....	.....	2,502 15	100 00	775 62	35,340 02	.....	1,334 91	458 60	1,500 00	3,285 95	.....	3,752 32	77,286 65
Mission	.....	.....	24,448 39	433 95	.....	.....	.....	907 60	202 00	281 50	40,711 98	.....	1,162 23	295 00	1,225 00	3,025 85	.....	5,089 75	77,783 25
North Cowichan	1,750 00	1,168 63	20,731 75	.....	.....	.....	.....	800 00	.....	2,029 70	14,734 36	.....	278 20	655 00	747 05	4,196 94	.....	11,714 49	58,806 12
North Vancouver	46,454 87	13,490 04	48,063 52	4,001 58	$ 733 68	.....	792 86	43,131 06	2,412 70	10,656 96	51,976 29	19,608 63	3,460 83	360 00	2,550 00	21,852 76	20,570 32	34,989 92	325,196 02
Oak Bay	52,139 74	39,655 59	18,686 91	1,155 28	1,015 14	2,954 02	4,500 00	500 00	966 90	6,614 27	73,526 09	6,961 06	3,740 58	2,108 75	.....	11,987 40	26,829 45	46,139 55	299,480 73
Peachland	622 00	376 09	1,320 17	1,778 00	4 00	.....	25 00	.....	143 49	116 40	8,141 54	.....	710 27	.....	550 00	1,127 12	6,154 52	2,548 40	23,617 00
Penticton	4,515 00	2,131 28	16,711 47	5,000 00	156 20	.....	3,933 54	7,342 20	232 80	6,173 88	55,327 68	.....	2,431 23	1,178 51	2,250 00	8,102 62	95,339 77	30,407 86	241,334 04
Pitt Meadows	.....	.....	5,024 70	.....	.....	.....	.....	929 32	100 00	367 75	4,539 08	.....	90 27	55 00	525 00	1,973 33	.....	3,335 50	16,939 95
Point Grey	182,250 71	33,832 56	72,070 07	15,201 95	23,549 23	39,277 63	30,409 61	3,000 00	2,527 30	28,169 91	242,476 95	15,944 59	8,723 01	2,633 15	3,100 00	31,397 64	128,264 02	129,023 26	991,818 59
Richmond	16,912 29	3,872 57	71,050 89	.....	.....	.....	.....	.....	1,456 25	6,072 76	54,062 87	.....	2,036 97	580 00	2,500 00	8,643 63	30,263 94	26,217 61	232,669 78
Saanich	30,721 63	27,351 76	88,065 49	1,161 75	1,100 00	.....	3,485 85	11,186 25	306 75	10,214 70	131,721 61	14,213 71	4,174 71	2,749 10	2,000 00	21,371 69	51,694 27	36,996 40	438,425 67
Salmon Arm	933 00	779 03	18,798 22	.....	.....	.....	.....	500 00	.....	177 00	14,788 91	.....	627 52	436 25	1,125 00	3,064 84	.....	10,967 48	52,197 25
South Vancouver	220,053 36	67,201 00	183,166 97	19,816 06	.....	128,175 97	24,352 74	20,690 41	4,352 47	29,512 35	468,720 99	279 34	35,960 31	5,993 71	.....	66,400 65	151,713 47	126,717 61	1,553,107 41
Spallumcheen	2,431 00	1,023 34	17,638 58	.....	.....	.....	.....	350 00	60 00	.....	26,597 92	.....	546 08	775 00	1,000 00	2,318 43	3,837 89	7,764 96	64,343 20
Sumas	.....	.....	8,881 85	.....	.....	.....	.....	300 00	100 00	167 67	10,919 22	.....	79 68	200 00	800 00	1,900 22	.....	1,269 30	24,617 94
Summerland	2,450 00	1,759 69	6,869 47	500 00	.....	.....	278 31	500 00	57 25	739 12	33,897 23	.....	616 17	823 75	1,700 00	2,855 98	62,430 98	7,942 29	123,420 24
Surrey	.....	.....	56,189 07	368 55	.....	.....	.....	2,433 95	383 24	8,250 93	55,029 34	.....	5,093 33	700 00	2,700 00	15,185 73	.....	21,794 78	168,128 92
West Vancouver	21,352 24	4,664 39	41,070 05	.....	733 67	.....	3,025 00	334 25	474 20	4,850 45	27,389 72	31,701 81	482 42	557 50	2,000 00	12,106 45	109,224 43	15,748 14	275,714 72
Totals	$ 681,266 69	$ 241,329 50	$ 965,478 25	$ 65,742 80	$ 27,291 92	$186,014 28	$ 73,164 88	$110,830 55	$ 16,143 11	$ 157,111 93	$1,748,246 08	$ 118,972 36	$ 93,069 95	$ 27,882 26	$ 39,397 05	$ 294,819 80	$ 828,122 90	$ 692,100 55	$ 6,366,993 86
Cities forward	2,180,654 83	1,625,353 91	1,261,072 25	222,157 32	158,323 43	193,951 26	789,720 71	351,664 76	119,273 15	874,332 01	3,549,817 21	243,601 75	282,395 40	176,718 91	52,632 22	484,186 33	2,383,907 16	1,274,403 27	16,224,165 88
Cities and districts	$2,861,921 52	$1,866,683 41	$2,226,550 50	$ 287,900 12	$185,615 35	$379,965 54	$862,885 59	$462,504 31	$135,416 26	$1,031,443 94	$5,298,063 29	$ 362,574 11	$ 375,465 35	$ 204,601 17	$ 92,029 27	$ 779,006 13	$3,212,030 06	$1,966,503 82	$22,591,159 74

VIII.—TAXES LEVIED, 1921.

CITIES.		DISTRICTS.	
Alberni	$ 23,688 65	Burnaby	$ 427,141 28
Armstrong	27,376 28	Chilliwhack	74,182 28
Chilliwack	58,227 53	Coldstream	24,408 83
Courtenay	21,252 58	Coquitlam	28,204 63
Cranbrook	65,235 10	Delta	101,080 08
Cumberland	13,512 13	Esquimalt	102,718 83
Duncan	22,719 22	Fraser Mills	4,165 71
Enderby	23,695 59	Kent	18,106 54
Fernie	73,848 16	Langley	65,427 37
Grand Forks	38,518 74	Maple Ridge	52,520 00
Greenwood	14,796 90	Matsqui	54,582 00
Kamloops	131,143 68	Mission	73,001 47
Kaslo	14,621 16	North Cowichan	64,730 00
Kelowna	95,744 45	North Vancouver	187,879 97
Ladysmith	23,494 58	Oak Bay	203,195 21
Merritt	24,402 85	Peachland	12,585 72
Nanaimo	156,957 18	Penticton	99,054 62
Nelson	115,822 58	Pitt Meadows	12,163 23
New Westminster	435,829 91	Point Grey	734,422 60
North Vancouver	346,269 71	Richmond	151,712 34
Port Alberni	34,787 58	Saanich	254,449 26
Port Coquitlam	61,999 34	Salmon Arm	29,981 95
Port Moody	44,503 19	South Vancouver	798,960 00
Prince George	83,894 69	Spallumcheen	42,014 21
Prince Rupert	329,609 17	Sumas	19,233 29
Revelstoke	82,265 94	Summerland	57,872 30
Rossland	32,923 72	Surrey	99,458 49
Salmon Arm	20,832 58	West Vancouver	95,431 83
Slocan	4,036 50		
Trail	72,828 32	Total	$ 3,888,684 04
Vancouver	5,410,479 56	Cities forward	9,469,176 80
Vernon	148,828 75		
Victoria	1,415,030 48	Cities and districts	$13,357,860 84
Total	$9,469,176 80		

IX.—COMPARATIVE STATEMENT OF MONEYS COLLECTED FROM PRINCIPAL SOURCES OF REVENUE, 1914–21.

Item of Revenue.	1914.	1915.	1916.	1917.	1918.	1919.	1920.	1921.
Taxes	$8,698,819 73	$8,639,020 63	$8,461,513 83	$9,340,932 90	$10,593,177 86	$14,055,731 10	$15,467,662 57	$14,550,526 21
Trade licences	163,919 85	158,510 20	143,939 90	158,731 75	153,450 30	320,788 84	407,306 86	464,731 83
Government grant to schools	760,000 99	790,001 16	748,848 07	824,259 72	892,109 73	898,897 73	970,164 26	1,186,156 43
Fines and costs	130,568 40	95,497 51	83,885 73	104,150 51	160,885 74	221,527 47	358,910 22	291,124 42

X.—COMPARATIVE STATEMENT OF EXPENDITURES ON STREETS, FIRE, ADMINISTRATION OF JUSTICE, PUBLIC HEALTH, COUNCIL SALARIES, AND SCHOOLS, 1914–21.

Item of Expenditure.	1914.	1915.	1916.	1917.	1918.	1919.	1920.	1921.
Streets	$5,323,970 48	$2,444,368 70	$1,445,660 72	$1,350,198 45	$1,266,277 09	$1,583,288 74	$1,940,481 75	$2,226,550 50
Fire	769,772 90	604,149 62	569,745 77	545,744 64	587,191 46	682,403 75	808,884 66	862,885 59
Administration of justice	803,361 73	681,660 19	570,943 46	562,158 66	600,507 81	743,180 05	942,193 35	1,031,443 94
Public health	246,977 52	207,494 80	170,850 73	166,343 50	200,612 70	196,535 88	170,415 36	135,416 26
Council salaries	92,556 38	82,616 96	77,353 91	80,869 04	80,940 06	84,721 10	80,881 94	92,029 27
Schools	2,693,645 19	2,661,051 65	2,680,265 77	2,902,801 83	3,154,418 13	3,716,626 49	4,482,609 57	5,298,063 29

XI.—MONEY BY-LAWS.

Certificates of approval were issued during 1921 for money by-laws as follows:—

Date.	Municipality.	By-law No.	Purpose.	Amount.	Term.	Rate.
1921.					Years.	Per Cent.
Jan. 14	Courtenay	55	Schools	$ 30,000 00	20	7
„ 28	Kent	67	Dyking	20,000 00	20	6
Feb. 18	Chilliwack (City)	249	Paving	24,500 00	10	6
„ 18	„ „	250	„	21,500 00	10	6
Mar. 4	North Vancouver (District)	....	Hospital	11,000 00	5	6
„ 9	Trail	256	Waterworks	37,000 00	20	7
„ 9	„	257	Parks	5,000 00	20	7
„ 16	Kamloops	302	Schools	18,000 00	15	7
„ 24	„	307	„	35,000 00	20	7
„ 30	Salmon Arm (District)	126	Road improvements	10,000 00	20	6

April 12	Burnaby	294	Schools	$ 74,000 00	15	6
„ 12	„	295*	Waterworks extension	60,000 00	20	6
„ 26	Coquitlam (District)	134	Waterworks construction	6,000 00	10	6
„ 27	Cranbrook	188	Electric light	60,000 00	20	6½
May 12	North Vancouver (City)	418	Schools	2,750 00	12	6
„ 23	Port Coquitlam	113	Refunding treasury certificates	100,000 00	20	7
June 6	Nanaimo	334	Schools	15,000 00	10	6
„ 7	Courtenay	52	Waterworks	60,000 00	30	6
„ 7	„	58	„	50,000 00	30	6
„ 20	North Vancouver (City)	417–467	Schools	11,550 00	12	6
„ 20	Penticton	242	Irrigation	100,000 00	30	6
„ 20	„	243	Domestic water system	35,000 00	20	6
„ 20	„	244	Electric light and power	30,000 00	20	6
„ 20	„	245	Schools	50,000 00	30	6
July 21	Kelowna	301–306	Recreation-grounds	5,500 00	10	7
Aug. 16	Spallumcheen	241	Schools	10,000 00	10	6
„ 16	Armstrong	94	„	11,000 00	10	6
„ 18	Surrey	203	„	28,700 00	10	6
„ 19	Trail	271	„	50,000 00	20	6
„ 22	Richmond	272	Drainage	7,500 00	20	6
„ 24	Salmon Arm (District)	134	Schools	11,500 00	20	6
Sept. 6	Salmon Arm (City)	116	„	11,500 00	20	6
„ 7	Prince George	132	Street improvements	20,000 00	10	6
Oct. 5	Chilliwhack (District)	....	Schools	24,833 33	10	6
„ 5	Merritt	105	„	8,000 00	15	6
„ 5	Prince George	134	Electric light	5,000 00	15	6
„ 5	„	136	Waterworks	14,000 00	15	6
„ 11	Victoria	2134	Local improvements	$2,483 14		
„ 11	„	2146	„ „	955 81		
„ 11	„	2149	Local improvement consolidation	3,438 95	10†	6
„ 13	Point Grey	30	Schools	195,000 00	20	5½
„ 17	Chilliwhack (District)	....	Dredge	15,000 00	10	6
Nov. 10	Saanich	259	Waterworks	150,000 00	30	6½
„ 14	Duncan	151	Local improvement, streets	4,000 00	15	6½
„ 14	„	152	„ „	8,500 00	15	6½
„ 30	Coquitlam (District)	148	Waterworks	5,500 00	10	6
Dec. 9	Oak Bay	260	Schools	68,000 00	20	5½
„ 14	Prince Rupert	376	„	36,000 00	28	6
„ 22	Summerland	145	Electric light	8,000 00	10†	7
				$1,567,272 28		

* Repealed by By-law No. 337. † Instalments.

XII.—PUBLIC UTILITIES, 1921.

It will be recognized that it is impossible with the limited information at hand to make an exhaustive report of the actual surplus or shortage of the municipal utilities, but the statements submitted will show the extent of the demands upon the other revenues of the municipalities by the public utilities, or, as the case may be, the extent to which the other revenues of the municipalities are supplemented by those from the public utilities.

ELECTRIC LIGHT—CITIES.

Municipality.	Estimated Value of Plant.	Cost of Maintenance and Operation.	Construction Expenditure paid from Revenue.	Payment of Interest and Sinking Fund or Instalments of Principal.	Total Cost.	Receipts.	Surplus for the Year.	Shortage for the Year.
Alberni	$ 9,596 69	$ 4,130 61	.....	$ 972 17	$ 5,102 78	$ 2,993 13	.....	$ 2,109 65
Armstrong	82,336 28	12,445 57	.....	5,751 96	18,197 53	17,497 78	.....	699 75
Courtenay	41,776 55	5,554 32	.....	3,155 55	8,709 87	14,516 35	$ 5,806 48	.....
Cranbrook	61,050 34	32,895 15	$ 1,037 19	5,914 80	39,847 14	40,941 05	1,093 91	.....
Duncan	64,500 00	9,676 38	.....	5,460 78	15,137 16	15,919 64	782 48	.....
Fernie	64,149 32	28,212 16	.....	5,659 88	53,872 04	38,853 89	4,983 85	.....
Grand Forks	16,300 00	8,892 70	.....	.....	8,892 70	15,301 44	6,408 74	.....
Kamloops	188,306 75	81,486 86	.....	17,669 16	99,156 02	111,235 23	12,079 21	.....
Kaslo	27,621 26	5,006 45	.....	2,917 30	7,923 75	10,121 20	2,197 45	.....
Ladysmith	26,900 77	20,894 38	.....	1,865 30	22,759 68	20,030 98	.....	2,728 70
Nelson	318,542 07	32,907 72	.....	24,119 65	57,027 37	74,755 32	17,727 95	.....
New Westminster	179,679 74	49,423 49	.....	11,874 05	61,297 54	105,972 80	44,675 26	.....
Port Alberni	53,784 63	6,844 32	11,029 14	3,743 27	21,616 73	12,146 36	.....	9,470 37
Prince George	77,234 83	20,980 59	3,527 60	8,472 34	32,980 53	29,364 43	.....	3,616 10
Prince Rupert	378,795 86	41,057 79	.....	28,856 89	69,914 68	96,256 25	26,341 57	.....
Revelstoke	210,900 00	17,672 13	.....	18,966 53	36,638 66	38,152 20	1,513 54	.....
Salmon Arm	37,761 05	4,466 46	734 61	3,402 72	8,603 79	6,246 03	.....	2,357 76
Vernon	143,986 91	37,346 20	.....	16,862 95	54,209 15	54,802 76	593 61	.....
Totals	$ 1,983,223 05	$ 419,893 28	$ 16,328 54	$ 165,665 30	$ 601,887 12	$ 705,108 84	$124,204 05	$ 20,982 33

ELECTRIC LIGHT—DISTRICTS.

Peachland	$ 17,740 86	$ 3,225 97	.....	$ 1,656 31	$ 4,882 28	$ 4,408 80	.....	$ 473 48
Penticton	158,371 60	29,003 26	.....	14,542 99	43,546 25	39,167 65	.....	4,378 60
Summerland	26,808 80	5,613 63	.....	1,934 19	7,547 82	8,214 53	$ 666 71	.....
Totals	$ 202,921 26	$ 37,842 86	.....	$ 18,133 49	$ 55,976 35	$ 51,790 98	$ 666 71	$ 4,852 08
Cities forward	1,983,223 05	419,893 28	$ 16,328 54	165,665 30	601,887 12	705,108 84	124,204 05	20,982 33
Cities and districts	$ 2,186,144 31	$ 457,736 14	$ 16,328 54	$ 183,798 79	$ 657,863 47	$ 756,899 82	$124,870 76	$ 25,834 41

Waterworks—Cities.

Alberni	$ 52,205 04	$ 1,013 75	.....	$ 5,805 65	$ 6,819 40	$ 1,537 34	.....	$ 5,282 06
Armstrong	42,313 22	2,794 28	.....	3,032 64	5,826 92	6,678 36	$ 851 44	.....
Cranbrook	184,390 90	3,021 66	$ 559 57	17,105 48	20,686 71	21,588 86	902 15	.....
Duncan	25,000 00	3,515 13	.....	2,100 30	5,615 43	5,686 36	70 93	.....
Enderby	22,815 08	1,722 45	948 26	1,702 06	4,372 77	3,579 58	.....	793 19
Fernie	114,414 47	3,867 94	.....	8,451 28	12,319 22	23,121 84	10,802 62	.....
Grand Forks	44,800 00	6,559 66	.....	2,767 75	9,327 41	9,377 78	50 37	.....
Greenwood	27,037 51	660 61	.....	2,317 50	2,978 11	1,924 40	.....	1,053 71
Kamloops	274,255 69	28,465 84	.....	24,275 69	52,741 53	40,900 15	.....	11,841 38
Kaslo	22,500 00	3,463 38	.....	220 85	3,684 23	4,266 96	582 73	.....
Nanaimo	386,045 18	15,760 67	145 42	21,780 92	37,687 01	37,052 46	.....	634 55
Nelson	45,078 66	3,794 23	.....	640 20	4,434 43	30,206 34	25,771 91	.....
New Westminster	475,158 42	31,014 83	.....	53,573 64	84,588 47	86,580 73	1,992 26	.....
North Vancouver	603,370 88	10,403 21	.....	28,565 63	38,968 84	23,116 58	.....	15,852 26
Port Alberni	176,867 90	4,038 52	.....	13,231 12	17,269 64	6,146 66	.....	11,122 98
Port Coquitlam	46,000 00	3,116 91	.....	6,783 01	9,899 92	4,426 15	.....	5,473 77
Port Moody	66,420 54	534 56	.....	6,481 54	7,016 10	5,505 65	.....	1,510 45
Prince George	90,658 57	4,581 84	1,586 62	13,229 15	19,397 61	10,254 53	.....	9,143 08
Prince Rupert	591,334 30	16,175 74	4,675 46	36,258 26	57,109 46	34,285 03	.....	22,824 43
Revelstoke	68,400 00	2,211 93	.....	6,247 96	8,459 89	14,461 25	6,001 36	.....
Rossland	35,000 00	1,252 58	.....	5,847 59	7,100 17	9,897 40	2,797 23	.....
Salmon Arm	60,458 80	397 40	560 06	6,886 64	7,844 10	4,465 26	.....	3,378 84
Slocan	4,568 05	7 50	.....	.....	7 50	168 53	161 03	.....
Trail	126,320 38	3,365 09	.....	10,527 43	13,892 52	17,627 15	3,734 63	.....
Vancouver	5,234,832 07	318,381 68	.....	245,010 94	563,392 62	505,407 36	.....	57,985 26
Vernon	197,532 81	7,664 82	1,210 43	18,163 29	27,038 54	26,255 75	.....	782 79
Victoria	4,452,095 73	49,971 40	1,593 96	219,970 88	271,536 24	271,655 35	119 11	.....
Totals	$13,469,874 20	$ 527,757 61	$ 11,279 78	$ 760,977 40	$1,300,014 79	$1,206,173 81	$ 53,837 77	$147,678 75

XII.—PUBLIC UTILITIES, 1921—*Continued.*

WATERWORKS—DISTRICTS.

Municipality.	Estimated Value of Plant.	Cost of Maintenance and Operation.	Construction Expenditure paid from Revenue.	Payment of Interest and Sinking Fund or Instalments of Principal.	Total Cost.	Receipts.	Surplus for the Year.	Shortage for the Year.
Burnaby	$ 723,096 05	$ 31,389 76	$ 14,850 51	$ 45,772 72	$ 92,012 99	$ 39,291 11	.....	$ 52,721 88
Coldstream	93,924 40	6,425 53	.....	7,139 56	13,565 09	1,956 68	.....	11,608 41
Coquitlam	19,175 42	984 83	.....	2,814 16	3,798 99	796 82	.....	3,002 17
Delta	205,000 00	11,489 82	.....	11,932 95	23,422 77	11,932 19	.....	11,490 58
North Vancouver	176,957 87	7,958 82	.....	12,611 50	20,570 32	10,325 02	.....	10,245 30
Oak Bay	200,000 00	10,198 16	2,077 32	14,553 97	26,829 45	23,950 12	.....	2,879 33
Peachland	8,016 50	478 23	.....	794 01	1,272 24	963 24	.....	309 00
Penticton	175,650 80	4,373 91	.....	15,061 72	19,435 63	21,390 00	$ 1,954 37	.....
Point Grey	1,541,751 39	18,463 83	30,544 83	79,255 36	128,264 02	40,364 01	.....	87,900 01
Richmond	382,875 34	10,162 72	9,926 47	19,174 75	39,263 94	29,474 99	.....	9,788 95
Saanich	454,103 08	20,016 79	.....	31,677 50	51,694 29	38,334 25	.....	13,360 04
South Vancouver	962,890 40	81,157 32	16,558 72	53,997 43	151,713 47	91,079 57	.....	60,633 90
West Vancouver	107,072 78	13,773 24	.....	9,886 67	23,659 91	11,974 80	.....	11,685 11
Totals	$ 5,050,514 03	$ 216,872 96	$ 73,957 85	$ 304,672 30	$ 595,503 11	$ 321,832 80	$ 1,954 37	$273,624 68
Cities forward	13,469,874 20	527,757 61	11,279 78	760,977 40	1,300,014 79	1,206,173 81	53,837 77	147,678 75
Cities and districts	$18,520,388 23	$ 744,630 57	$ 85,237 63	$1,065,649 70	$1,895,517 90	$1,528,006 61	$ 55,792 14	$423,303 43

SUNDRY UTILITIES.

Water and Light.								
Kelowna	$ 108,616 81	$ 46,208 51	$ 7,674 24	$ 12,121 87	$ 66,004 62	$ 64,862 79	.....	$ 1,141 83
Merritt	53,185 07	21,719 19	1,322 78	5,671 37	28,713 34	26,189 26	.....	2,524 08
Gas.								
Nelson	50,000 00	14,937 50	.....	3,381 68	18,319 18	16,236 99	.....	2,082 19
Irrigation-system.								
Penticton	215,876 80	12,710 21	.....	19,647 68	32,357 89	23,878 37	.....	8,479 52
Irrigation and Domestic Water.								
Summerland	334,610 55	24,568 77	.....	30,314 39	54,883 16	34,970 94	.....	19,912 22
Hydro-electric.								
Kamloops	347,915 31	17,514 48	.....	30,911 74	48,426 22	47,163 00	.....	1,263 22
Ferries.								
North Vancouver	247,538 39	234,725 24	.....	17,518 86	252,244 10	277,024 39	$ 24,780 29	.....
West Vancouver	62,243 51	73,281 54	.....	12,282 98	85,864 52	71,215 10	.....	14,349 42
Street-railway.								
Nelson	80,264 13	19,795 63	.....	7,228 70	27,024 33	20,828 04	.....	6,196 29
Telephone.								
Prince Rupert	76,982 61	26,142 93	.....	11,612 48	37,755 41	43,890 20	6,134 79	.....
Totals	$ 1,577,233 18	$ 491,604 00	$ 8,997 02	$ 150,691 75	$ 651,592 77	$ 626,259 08	$ 30,915 08	$ 55,948 77

MUNICIPAL OFFICIALS.

CITIES.

City.	Clerk.	Treasurer.	Mayor.
Alberni	Spratt, C. J.	...	Motion, J. R.
Armstrong	Fifer, A. J.	...	Parks, J. Z.
Chilliwack	Brown, P. J.	...	Ashwell, J. H.
Courtenay	Wood, C. S.	...	Simms, C.
Cranbrook	Roberts, T. M.	...	Genest, A.
Cumberland	Mordy, T.	...	McDonald, D. R.
Duncan	Greig, J.	...	Miller, G. F.
Enderby	Rosoman, G.	...	Smedley, G. H.
Fernie	Moffatt, A. J.	...	Henderson, G. G.
Grand Forks	Hutton, J. A.	...	Hull, G. H.
Greenwood	Walters, G. S.	...	Gulley, T. M.
Kamloops	Jackson, A. W.	...	Burton, S. C.
Kaslo	Papworth, W. V.	...	Anderson, J.
Kelowna	Dunn, G. H.	...	Sutherland, D. W.
Ladysmith	Callin, C. G.	...	Walkem, W. W.
Merritt	Gay, F. S.	...	Cranna, W.
Nanaimo	Hackwood, H.	Gough, S.	Bushby, F. A.
Nelson	Wasson, W. E.	...	McHardy, C. F.
New Westminster	Thomas, T. J.	Bowell, A. J.	Johnston, J. J.
North Vancouver	Archibald, R. F.	Lane C. R.	Morden, G. H.
Port Alberni	Cronk, E. J.	...	MacIntyre, A. D.
Port Coquitlam	Smith, J.	...	Mars, A.
Port Moody	Lye, J. J.	...	Roe, P D.
Prince George	Tate, D. G.	...	Johnson, J. H.
Prince Rupert	Woods, E. A.	Vance, W. D.	Rochester, H. B.
Revelstoke	Gordon, W. A.	...	Bews, W.
Rossland	McLeod, J. A.	...	Pitt, A. R.
Salmon Arm	Lingford, R.	...	Newnes, W.
Slocan	Graham, W. E.	...	McNeish, T.
Trail	Monypenny, W. E. B.	...	Martin, A. J.
Vancouver	McQueen, W.	Johnstone, J.	Tisdall, C. E.
Vernon	Edwards, J. G.	...	Costerton, C. F.
Victoria	Bradley, E. W.	Smith, E. C.	Marchant, W.

MUNICIPAL OFFICIALS—*Continued.*

DISTRICTS.

District	Clerk and Treasurer.	Reeve.	Address.
Burnaby	Moore, A. G.	McLean, A. K.	Edmonds.
Chilliwhack	Webb. C. W.	MacLeod, J. A.	Chilliwack.
Coldstream	Henderson, E.	Cunliffe, Major E. H.	Vernon.
Coquitlam	Newman, R.	Marmont, L. E.	Maillardville.
Delta	McDiarmid, N. A.	Williamson, J. A.	Ladner.
Esquimalt	Pullen, G. H.	Lockley, A.	Esquimalt.
Fraser Mills	Stewart, G. G.	Scott, Dr. R. H.	Fraser Mills.
Kent	Fooks, H.	Morrow, J. A. H.	Agassiz.
Langley	Payne, R. A.	Poppy, D. W.	Murrayville.
Maple Ridge	McFarlane, J. C.	McIver, J. A.	Port Haney.
Matsqui	LeFeuvre, J. A.	McCallum, A.	Aldergrove.
Mission	Barr, J. A.	Knight, R. E.	Mission.
North Cowichan	Crane, C. S.	Aitken, A. C.	Duncan.
North Vancouver	Farmer, J. G.	McNaught, J. Y.	North Vancouver.
Oak Bay	Blandy, R. F.	Drake, S. J.	Oak Bay.
Peachland	Dryden, W.	Lang, Grant	Peachland.
Penticton	Bracewell, B. C.	Chambers, E. J.	Penticton.
Pitt Meadows	McDermott, W.	Park, W. J.	Pitt Meadows.
Point Grey	Floyd, H.	Lembke, W. H.	Kerrisdale.
Richmond	Shepherd, S.	Tilton, J.	Eburne.
Saanich	Cowper, H. S.	Watson, G. F.	Royal Oak.
Salmon Arm	Lacey, J. E.	Wilcox, F. E.	Salmon Arm.
South Vancouver	Riley, W. T.	McClintock, W. F. (Gray, A. W., Commissioner)	South Vancouver.
Spallumcheen	Wiglesworth, J. R.	Hassen, M.	Armstrong.
Sumas	Chas. Courtman	Cook, J. R.	Huntingdon.
Summerland	Nixon, F. J.	Campbell, J. R.	Summerland.
Surrey	Lemax, C.	McKenzie, R. D.	Cloverdale.
West Vancouver	Ollason, J.	Vinson, V. V.	Hollyburn.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1922.

PROVINCE OF BRITISH COLUMBIA

ANNUAL REPORT

OF

THE DEPARTMENT OF LABOUR

FOR THE

YEAR ENDING DECEMBER 31ST

1921

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1922.

To His Honour WALTER CAMERON NICHOL,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

The Annual Report of the Department of Labour of the Province for the year 1921 is hereby respectfully submitted.

A. M. MANSON,

Minister of Labour.

Office of the Minister of Labour,

May, 1922.

The Honourable A. M. Manson,
Minister of Labour.

Sir,—I have the honour to submit herewith my fourth Annual Report on the work of the Department of Labour up to December 31st, 1921.

I have the honour to be,
Sir,
Your obedient servant,

J. D. McNIVEN,
Deputy Minister of Labour.

Department of Labour, Victoria, B.C.,
May, 1922.

REPORT OF THE DEPUTY MINISTER OF LABOUR FOR 1921.

The outstanding feature of labour affairs in the Province during the year 1921 was the unprecedented amount of unemployment which continued over the entire period. In past years we have been accustomed to an annual period of slackness between November and March, caused by a partial closing-down of seasonal industries, and in a less degree by men voluntarily leaving their jobs up-country and coming to town for the winter, thus causing a congestion of labour in the large cities. But during 1921 the relief that was looked for from the opening-up of mills and camps in the spring did not materialize, and the Province was faced with an entirely new situation, the continuance, in a large measure, of winter unemployment conditions through the spring and summer months.

Unemployment and Wages.

It will be remembered that the activity which marked the Province's basic industries of lumber and mining during the summer of 1920, thus ensuring prosperity in our numerous smaller industries, experienced a sudden collapse early in November of that year. Employers explained that the bottom had fallen out of prices and that they could no longer pay existing costs of production and sell without loss. They therefore stated that there was no alternative but to close down, and this course was followed in a very large number of instances, many mills and camps remaining idle for nearly a whole year. This state of things had a marked effect upon wages. With the unemployed crowding into our cities by the thousand, those employers who decided to open up work were able, to a larger extent than formerly, to secure labour upon their own terms. The year 1921 thus developed into a period of falling wages, just as the preceding few years had been a period of rising wages. In 1920 it was unusual to hear of men in logging or mining camps receiving less than $5 per day. In the latter part of 1921 numbers of cases were being reported where the pay for a ten-hour day was $2.75 or $3. In face of this change, it is difficult to understand the action of many employers whose workers are obliged to live in camps in keeping up the charge for board at the figure of 1920, notwithstanding the reduction which had taken place in the interval in the price of many articles of food.

Few Strikes or Labour Disputes.

Where a reduction in wages was effected, it followed usually upon a period during which work was closed down. A camp or mill where all work was suspended, perhaps for several months, would be started again with a new crew of workers and with a new wage schedule. If the man who had the first chance of a job refused it on account of the rate of pay, some one else would be taken on. There were comparatively few strikes or labour disputes in the ordinary sense, as employers were apparently not anxious to resume operations unless they could obtain a sufficient number of workers to accept their terms without demur, the state of the market offering them little inducement to do so. Thus it would appear that a state of widespread unemployment has as its corollary an indisposition on the part of workers to use the strike weapon. So far as cost of production and immunity from labour troubles went, 1921 was a much more favourable period for employers than the preceding year. When, however, we find that both lumber and metals were commanding little more than half the price at which they were sold in the summer of 1920, we need not look further to see what prevented employers from taking advantage of otherwise favourable conditions to produce on a larger scale.

Plans adopted for giving Relief.

Before the end of 1920 it was recognized that the ordinary measures for affording relief in the cities would not suffice to cope with the large and increasing number of people who were in needy circumstances through unemployment. The lines on which the problem was to be dealt with were laid down by the Dominion Government, who decided not to participate in any scheme for setting up relief-work of an emergency character, but to assist in the giving of relief grants in money or kind. For the latter purpose the Dominion Government offered to contribute one-third of the cost, provided one-third was forthcoming from the Provincial Government and the remaining one-third from the city or municipality. It was left to the last-named authority to

decide whether the scheme should be adopted or not. It should be noted that in the carrying-out of this plan the Provincial Governments were left without any initiative whatever, beyond the choice of agreeing or refusing to take a share in financing it. The plan itself was fixed by the Government at Ottawa, and the city or municipality had the option of saying whether it should be carried out or not. Thus circumscribed in its sphere of action, the Government of the Province decided that the best course to adopt was to take a share of the financial responsibility for carrying out the scheme. It accordingly met the requisitions for the payment of one-third of the expense, and from the initiation of the scheme to December 31st, 1921, the payments on this account from the Provincial Treasury amounted to $167,850.14.

Apart from its contribution under the joint scheme, the Provincial Government itself took an important part in meeting the unemployed situation throughout the year. In various districts work was done at a total cost of approximately $250,000, of which far the largest proportion was paid for labour.

Vancouver and Victoria are the two cities in the Province where the unemployed chiefly congregate in winter. These cities differed widely from each other in their method of approaching the problem, and it is worth while to devote a little attention to what was accomplished in each instance.

SCHEME SET ON FOOT IN VANCOUVER.

On November 20th, 1920, by which time a serious unemployment situation was beginning to develop in Vancouver, the registration of the unemployed was begun by the Employment and Relief Department of the city. The Council opened out emergency work on the roads, etc., the cost of which was provided from the city's current revenue. Further, work was undertaken in connection with the sewers of the city, there being already in existence a by-law authorizing such expenditure. Then a campaign was begun for the clearing of vacant lots. The plan was adopted of notifying the owners that such work must be begun within thirty days, and that if nothing was done within that period the city authorities would do the work, charging the cost to the owner.

AN ASSEMBLING-PLACE FOR UNEMPLOYED.

For all the above-mentioned work preference was given to men with families who were residents and taxpayers, the only exception being 100 men who were taken from the returned soldiers' clubs. The work was already under way when, on December 15th, the Dominion Government announced its scheme for relief to the unemployed. The Vancouver City Council immediately adopted this plan, as it was felt that the scheme already in operation would need to be supplemented by further measures. Many other authorities, however, did not adopt the Dominion Government's plan, and it is claimed in Vancouver that the effect was to draw unemployed men away from districts where the plan was not in operation to districts where it had been adopted. As the most conspicuous place coming under the latter heading, Vancouver quickly became the assembling-place for unemployed men from all parts of Western Canada. When the Employment and Relief Department for Vancouver first began to register the unemployed on November 20th, 1920, there were 802 registrations within a week. In the second week there were 159, in the third week 59, and in the fourth week 207, a total of 1,227 within four weeks. Then came the adoption of the Dominion Government's scheme. In the week ended December 24th there were 521 registered, from then to December 31st another 740, in the month of January there were 2,417, in February 1,700, and in March 770. Altogether, by the middle of summer, 8,200 registrations were taken. Of this number it was estimated that about one-half did not belong to the city, and that fully 2,000 were from other Provinces of Canada.

RESULTS OF ABNORMAL CONDITIONS.

None of these cases, it is stated, were the ordinary needy cases to be dealt with by the permanent machinery of the city, but they were looked upon as the results of the abnormal prevalence of unemployment. The city's own road and sewer work found employment for about 1,000 men, and from November, 1920, to June, 1921, the average amount paid per man was $330 for eighty-two days' work. The other men were assisted under the joint scheme of the Governments and the city. Many of them were given the work of rock-breaking, for which payment was made at the rate of $2.10 per yard. As it was not intended that this work should be looked upon as regular employment, single men were employed on it for only two days in the week

and married men for three or four days, and they were requested to obtain other work as soon as they could. For the two days' work the single men were given tickets good for an average of $5.50 weekly for meals and $2.50 to $3.50 for room-rent. A married man was given an order for the food required for himself and family and a cheque for the balance available for rent.

Apart from the rock-breaking, work was found in the way of cutting wood in Stanley Park. During a heavy storm in February about 1,000 trees were blown down in the Park, and these were sawn and split for cordwood, which was supplied to public institutions or given to the poor. Dead wood was removed and skid-roads were made when necessary to get to the fallen trees. Some trees were also cut down for the purpose of Park improvement, and similar work was done at Hastings Park. Two dollars and fifty cents per cord was paid for bucking and $2.50 for splitting the wood, which was equal to about $4 a day, and the men packing it and those working on the skid-roads received $4 a day. Other work was done in making roads through the Park, and in levelling and clearing, making bowling-greens, tennis-courts, and cricket-creases. Much good work was done, but scarcely on a paying basis, even without taking into account the large number of implements belonging to the city which were broken, lost, or stolen.

About April 15th the City Council decided to close down relief-work, but employment continued to be found for between 300 and 500 men with families. The dispensing of relief in the city under the joint scheme continued throughout the summer, the weekly number of recipients falling below 200 in July and August, and afterwards rising gradually until the winter set in again.

Relief Camp at Hastings Park.

When the pressure of the unemployment problem again became more acute in the closing months of 1921, the Vancouver City authorities devised a scheme for accommodating single men at Hastings Park, and setting them to work for two days a week on park improvements. The amount of pay for the two days' work was $6.40. Of this amount, $5.90 was to be paid for a full week's board and lodging, leaving each man with a margin of 50 cents. During the remaining portion of the week the men were encouraged to seek work of a permanent character. The scheme was put into operation early in December, and by the end of the year a considerable number of men were already taking advantage of it.

A Different Method in Victoria.

In Victoria the method of dealing with unemployment during the winter of 1920–21 differed fundamentally from what was done in Vancouver, in that the City Council decided not to adopt the Dominion plan. The view was taken that any announcement that relief was to be given along these lines would have the effect of bringing large numbers of out-of-work men into the city to participate in the dole. The Victoria City Council accordingly devised a scheme of their own, under which any indigent person out of work could present himself at the City Hall and be registered. Assistance was given in the form of orders for groceries and meat, inquiries into *bona fides* were made, and as soon as relief-work was available the applicant was communicated with and was expected to take up the employment offered.

Most of the employment found was in the way of cutting up the logs which had drifted on the beaches around the city, with a view to their sale as cordwood. Any man could offer himself for this work. The city authorities supplied axes, saws, peaveys, hammers, etc., and also provided the services of a man to keep the saws in condition. The men were recommended to arrange themselves in teams of three, one to saw, another to split, and a third to carry and pile the wood, these duties to alternate if desired. The wood was piled at various places on the cliff, to be conveyed later to the residences of purchasers.

About 300 men in all availed themselves of the scheme. Some were easily discouraged, or found the work too hard, and soon gave up; but others stuck to it, and, according to the city authorities, were able to make a fair livelihood. The authorities were not successful in keeping track of the implements lent out, and a very large number of these were either lost or stolen, the loss falling upon the city.

Lower Wages and Higher Cost.

Apart from this scheme, the city was able to borrow from the Provincial Government the sum of $50,000 to be spent in sewerage-work connecting up with the area of the Saanich Municipality. This was treated as relief-work and the men taken on received $3.50 a day.

The same rate of pay was given for relief-work in grading certain roads in the city, on which $5,000 was spent. The work on these two schemes, it was stated, cost as much as if it had been performed by men regularly in the employ of the city, who received $4.40 a day. The sewer and road-grading work found employment for about 200 men.

The sum of $3,398.95 was spent in handing out assistance to needy applicants, apart from what was earned on relief-work. In all, the cost to Victoria in dealing with the unemployed situation of the winter of 1920–21 was less than $10,000. Employment was found for about 500 men, but many other inquirers, when informed what kind of work was to be had, did not present themselves again. Some were probably not fit to take up work of an arduous nature, and it was noticeable that a large number of men asked specifically for clerical employment. At the end of the winter those administering the affairs of the city were still of opinion that it would have been a mistake to adopt the Dominion Government scheme. They considered that the City Council, by dealing with the situation in its own way, accomplished better results at a much smaller cost.

A REVISED SCHEME FOR 1921–22.

As to relief measures for the winter of 1921–22, when there was a condition of things very similar to that of the previous winter, the Dominion Government devised a scheme under which the local authorities would put into operation any necessary public works that could be undertaken during the winter months. If the cost of carrying out such work should exceed the normal, by reason of its being undertaken at an unsuitable period of the year, the Dominion Government arranged that the normal cost should be paid in full by the municipality, and that the excess cost over and above normal should be shared equally by the Dominion Government, the Provincial Government, and the municipality. (By a later order, on January 25th, 1922, the Dominion Government increased its contributions to one-half of the "cost over normal," the contribution of the Provincial Governments remaining at one-third and that of the local authorities being reduced to one-sixth.) Where work could not be so provided the Dominion Government offered to continue to refund one-third of the disbursements actually made by a municipality for unemployed relief, conditional upon the Province participating on equal terms.

The Provincial Government accepted its share in both these schemes. Under the first scheme, by which appropriations were to be made to meet the above-normal cost of public works undertaken in the winter, none of the local authorities had commenced operations up to the end of the year. Unemployed relief was, however, being granted under the second scheme by the Cities of Vancouver, Victoria, New Westminster, Kamloops, and Prince Rupert, and by the Municipalities of Burnaby, South Vancouver, and Oak Bay. (Other cities and municipalities took advantage of the schemes at a later date.)

CONFERENCES CALLED DURING SUMMER.

In view of the alarming state of unemployment in the Province, the Government took the unusual step of summoning about fifty representative large employers of labour to a conference in Vancouver on August 10th. The conference was well attended, and an appeal was made to the employers by the Hon. the Premier and the Hon. the Minister of Labour to do all in their power to keep the wheels of industry in motion. The following week two conferences were held, one in Vancouver and one in Victoria, which were attended by representatives of labour, returned soldiers, and municipal authorities. At these conferences a large number of suggestions were made as to the means by which work could be provided. Commencing about the middle of August, and for some two months after that period, the unemployment situation was partly relieved by the departure of some 6,000 men for work in the harvest-fields in the Prairie Provinces.

At the time of writing the conditions appear to be favourable for a revival of trade, and with it the passing of probably the most critical period the industries of this Province have ever known.

During the year the work of factory inspection in the Province, which had been under the supervision of the Minister of Public Works, was placed under the Minister of Labour. The separate reports on Factory Inspection, the Employment Service, and the Minimum Wage Board are given in the following pages. Other distinctive features of the report are the "Statistics of Wage-earners," containing a large amount of interesting information about industrial affairs in the Province, the directories of Trade Unions and Employers' Associations, and the record of the year's labour disputes.

STATISTICS OF TRADE AND INDUSTRIES.

For the fourth year in succession the Department of Labour has collected from the employers in the Province a large amount of interesting data relating to wages, working-hours, pay-roll, and the nationality of workers engaged in industrial occupations. It is gratifying to report that each year these particulars are given more readily by employers, thus affording the Department better means of presenting a reliable report upon conditions as they existed during the year under review. In 1918, when these details were collected for the first time, returns were received from 1,047 firms. In the following year 1,207 firms filled in the forms; last year 1,869; and the statistics now presented in the following pages are compiled from returns by 2,275 employing firms. Taking into account the fact that, owing to bad trade, a large number of firms, especially in the lumbering and mining groups, suspended operations for the whole of 1921, and were therefore not able to make a return for the present report, this number indicates, in a very satisfactory way, the increased interest which employers are taking in this branch of our departmental work.

In previous years the statistics gathered have embraced a twelve-month period, ending either in July or September; but it was frequently represented to the Department that firms making returns were put to inconvenience by this, and that forms could be more easily filled in if the period chosen were a single calendar year. Accordingly the change was made this year and returns asked for to cover the single year, 1921. On the whole this selection of date appears to suit the greater number of employers, and it will probably be more satisfactory to any one desiring to make use of the facts and figures here presented. In the grouping of the returns received, exactly the same plan has been followed as last year, the figures being tabulated for the various industries under twenty-five different heads.

WAGE-EARNERS AND SALARIED STAFF.

Only one change was made in the form of the questionnaire as compared with that of last year. In the former case employers were asked to state the total amount of their annual pay-roll for wage-earners only, leaving out the management and clerical staffs. There was reason to believe, however, that this distinction was not always clearly drawn by some employers, and that the total amount given as paid to wage-earners did, in fact, include in some instances payments to salaried officials and others not supposed to be included. This year, therefore, the Department asked that the amount of the annual payments should be stated under three heads, namely:—

Officers, superintendents, and managers ..... $.....
Clerks, stenographers, salesmen, etc. ..... $.....
Wage-earners (including piece-workers) ..... $.....

The resulting figures are given in these pages, and it will be interesting to compare the cost of managerial and clerical service and that of strictly industrial work in the various industries. Broadly speaking, of the total amounts paid in wages and salaries in these industrial groups, one-tenth goes to the officers, superintendents, and managers; one-tenth to clerks, stenographers, and salesmen; and four-fifths to the weekly wage-earners, skilled and unskilled. The proportions vary considerably according to the industrial group; in coal-mining, for instance, the daily and weekly wage-earners receive about 94 per cent. of the total. In a year of bad trade, such as 1921, the payment for office-help might be expected to be higher in proportion to that for weekly wages, as it is often necessary for a firm to keep its office open even if the factory or mine is closed down.

REASONS FOR SMALLER TOTAL.

The total salary and wage payments made by the 2,275 firms reporting amounted to $79,742,380.10; of which sum, $65,314,624.54 was paid to wage-earners. Last year the 1,869 firms who made their reports showed a pay-roll to wage-earners only of $82,866,708.31. We thus see a considerable falling-off in 1921 from the 1920 figures. Several causes contributed to this. In 1920 employment was plentiful; in 1921 it was very broken in the larger industries. Some concerns were closed down; many operated for shorter periods than before; and when they

were actually operating the amount of help engaged would be less than normal. Then the very general fall in wages (which will be dealt with later) was reflected in a reduced pay-roll.

In the lumber group of industries, although 533 firms have reported as compared with 474 in 1920, the aggregate payments to wage-earners show a reduction of about 40 per cent., or nearly $10,000,000 less than in the previous year. Metal-mining, with 98 firms reporting as compared with 112, shows a falling-off in the pay-roll of about $1,700,000. The few large firms engaged in smelting paid about $1,000,000 less in wages than in 1920. Ship-building, which has been steadily declining since the palmy days of 1918 and 1919, showed over $3,000,000 less paid in wages last year. A more complete series of returns have been received in the group dealing with public utilities, such as street-railways, telephones, etc., which on the figures available show an expanding pay-roll, and the same is true of the general contracting group, partly accounted for by the fact that large Government works were in progress. The pulp and paper pay-roll is down, and so is that of the metal trades; but several of the smaller industries, such as laundries, garment-making, breweries, and house-furnishing, have more than held their own.

RISE AND FALL OF SHIP-BUILDING.

As showing the rise and fall of ship-building, it may be mentioned that that industry first assumed large proportions in the Province in the latter part of 1916. In April, 1918, it was providing employment for 9,980 men. In February, 1919, the number had fallen to 8,656; in January, 1920, to 5,185; in January, 1921, to 2,322; and there was a gradual drop during last year, as old contracts were completed and new ones were not forthcoming, until in December last only 589 men were working in the shipyards.

JULY AND JANUARY—A WIDE DIFFERENCE.

The table headed "Average No. of Wage-earners" gives the total number employed, month by month, by the 2,275 firms sending in returns. Of male employees, there were 42,111 on the pay-roll in January. From then each month showed a slight increase, until in July the total was 50,496, and then there was a fall each month to December, when the figure was 43,165. This ebb and flow of employment is somewhat similar to what has been witnessed in each of the last four years. Going back to January, 1920, the returns in that month covered 51,726 male employees, and by the following July the number had grown to 58,935, followed by a slight fall to October, and then a very sharp drop in the last two months of that year, from which the industries of the Province have not yet fully recovered. Taking the two years together, the most active period for employment was in July, 1920, when 1,869 firms were employing 56,935 men, and the most stagnant period was January, 1921, when 2,275 firms were employing 42,111. It should be noted that 406 firms which are included in the latter total did not make any return for 1920, though it is certain that the great majority of them were in business in that year.

25,000 ON AND OFF THE PAY-ROLL.

To make the comparison fair as between the two years, we must add to the 1920 total an estimate of the number of men working for these 406 firms. These latter appear to have been mostly in only a small way of business, so the estimate is not a proportionate one; but it is fair to assume that 8 per cent. should be added to the number of employees for July, 1920, bringing that total up to 63,649. This may be stated as the number of male industrial workers who would be employed by the 2,275 firms at their busiest period in July, 1920, while at their quietest period, in January, 1921, the number had fallen to 42,111; and after rising to 50,496 in July, 1921, fell again to 43,165 last December. In other words, the number employed in January, 1921, was 21,538 below the maximum for the last two years, and in December last 20,474 below the maximum. It may be remembered that, at a conference with the leading employers of the Province in July last, the Hon. J. W. deB. Farris, then Minister of Labour, estimated that there would be 20,000 men out of work to be provided for during the ensuing winter.

Even this is not the complete story, however. There is still an appreciable number of employers who did not make a return to the Department in either of the past two years. Presumably they also would have their busiest period about July, 1920, and a corresponding decline in the various months since. Making allowance for these, it is probably no exaggera-

tion to say that the industrial employers of the Province had 25,000 more men on their pay-rolls in July, 1920, than they had in the following January, and 24,000 more than they had last December.

The Winter Army of Unemployed.

It would not be correct to say that these 25,000 men all become, in the ordinary sense, "unemployed" in the quiet seasons of the year. They constitute what might be called a "reservoir" of employable persons, upon whom the industries of the Province may draw at busy times, but for whom there is not a constant need. In times of depression some of them leave the country. Some are able to find a certain amount of alternative employment, especially in the country districts, where a man may fill in his unoccupied time by doing work around his home or on his own land. There are other men who frankly recognize the fact that the employment at which they earn their living is, at the best, only seasonal in its nature, and who, out of the earnings of the summer months, do their utmost to make provision for their winter needs, not expecting or looking for work during the close season of their own industry. However, the past winter has been a more difficult period than the previous one for men of this type, owing to the slackness of employment and the lower wages prevailing last summer.

After allowing for all these classes, we have each winter an army of unemployed; i.e., men who do not leave the country, who have no alternative employment to which they can turn, and who have either been unable or have failed to make provision for the winter. They are reinforced by people in the cities who, even in the busy times, are content to carry on from one casual job to another, and by men from the Prairie who troop to the Coast for the winter months.

Nationality of Workers.

In the tables dealing with the nationality of workers there is no great change apparent as compared with last year. Native Canadians are still the largest section, with natives of Great Britain and Ireland coming close behind. Oriental workers are in about the same proportion as before, a slight drop in the number of Chinese being made up by an increase in the number of Japanese and Hindus.

Lower Rates of Wages.

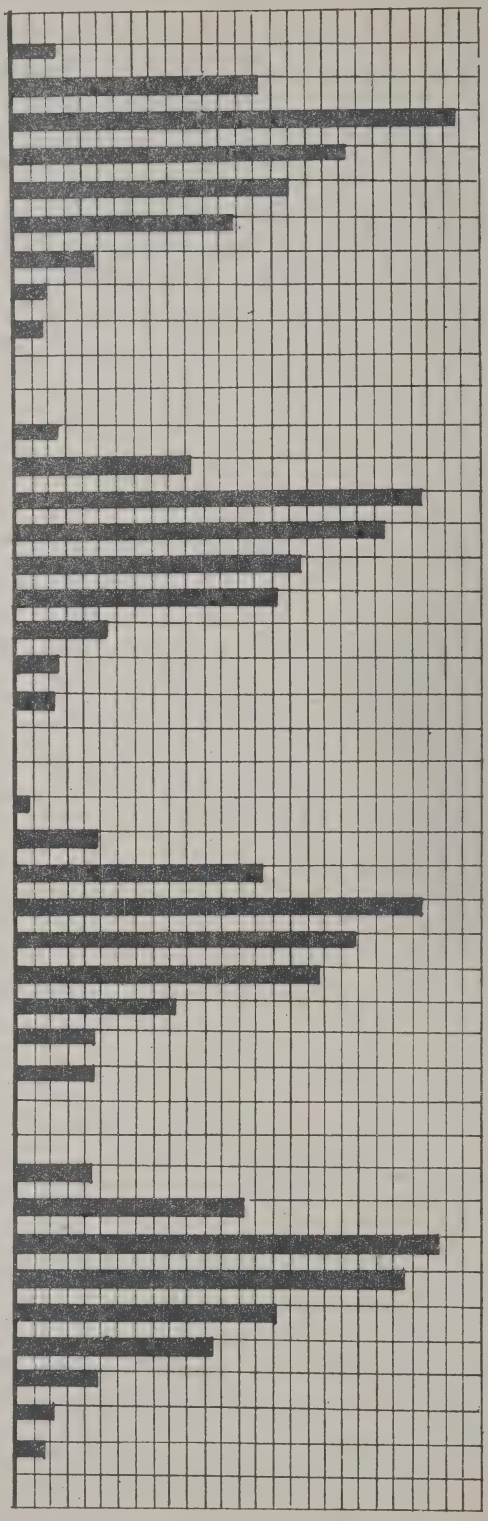
There is a decided tendency towards lower figures in the tables dealing with classified weekly wage-rates for the year. This tendency, however, is not without exception. Seven of the industrial groups, accounting for 8,485 workers in the week of employment of the greatest number, show an average increase in pay, but eighteen groups, accounting for 56,465 workers, show a decrease. Taking the total numbers, there was an average decrease of 12.34 per cent. compared with the wages for 1920. The largest increase is shown in oil-refining, one of the smaller groups, of 25.28 per cent. An increase is also shown in the Coast shipping group, but this is probably more apparent than real, as some firms are evidently in doubt as to whether they should include an allowance for board in the amount returned as a man's pay. An increase is shown in the average rate of pay in shipyards. This may arise from the firms remaining in business working with a smaller staff than formerly, but needing a larger proportion of highly-skilled and better-paid men.

All the lumbering industries report considerable reductions in wages, as also do the pulp and paper manufacturers and metal-mining, while the group of metal trades show a slight average decrease. Coal-mining and the builders' and contractors' group follow the same tendency. All these are industries with thousands of employees, but in which employment is either seasonal or irregular. This would suggest that, where an industry was closed down for a part of the year and a new crew of men engaged upon its resumption, the employers were able to impose their own terms, which often were less favourable to the men than in the previous year.

In the report for last year a series of diagrams were presented, showing the changes in prevailing industrial wages in the Province over a period of three years. A further diagram has been prepared on similar lines for the year 1921, and is now presented alongside the others, so that the wage fluctuations of the past four years may be seen at a glance.

CHART SHOWING FLUCTUATION IN WAGES—1918 TO 1921.

In the accompanying chart each series of black lines represents a different period. The first series represents the period of seven months from January 1st to July 31st, 1918; the second series the twelve months from August 1st, 1918, to July 31st, 1919; the third series from October 1st, 1919, to September 30th, 1920; and the fourth series from January to December, 1921. Each of the thin downward lines represents 1 per cent., so that a black line the length of ten of these spaces would mean that 10 per cent. of the industrial workers in the Province in that particular year were receiving the wages indicated in the opposite margin.



1918.		
Under $15 00 weekly,		2.64%
$15 to 19 99	,,	14.10%
20 to 24 99	,,	25.78%
25 to 29 99	,,	19.19%
30 to 34 99	,,	15.94%
35 to 39 99	,,	13.71%
40 to 44 99	,,	4.84%
45 to 49 99	,,	1.97%
50 and over	,,	1.83%

1918-19.		
Under $15 00	,,	2.49%
$15 to 19 99	,,	10.19%
20 to 24 99	,,	23.69%
25 to 29 99	,,	21.64%
30 to 34 99	,,	16.74%
35 to 39 99	,,	15.13%
40 to 44 99	,,	5.23%
45 to 49 99	,,	2.60%
50 and over	,,	2.29%

1919-20.		
Under $15 00	,,	0.79%
$15 to $19 99	,,	4.85%
20 to 24 99	,,	14.29%
25 to 29 99	,,	23.80%
30 to 34 99	,,	19.98%
35 to 39 99	,,	17.89%
40 to 44 99	,,	9.24%
45 to 49 99	,,	4.58%
50 and over	,,	4.58%

1921.		
Under $15 00	,,	4.35%
$15 to 19 99	,,	13.14%
20 to 24 99	,,	24.62%
25 to 29 99	,,	22.52%
30 to 34 99	,,	15.06%
35 to 39 99	,,	11.52%
40 to 44 99	,,	4.87%
45 to 49 99	,,	2.06%
50 and over	,,	1.86%

The difference between the wages of 1921 and those of 1920, as shown above, is very marked. Note the reduced percentage of those receiving wages of $30 a week and upwards and the increased percentage of those receiving smaller pay. As many as 4.35 per cent. of adult males were receiving less than $15 weekly, compared with 0.79 per cent. in 1920, 2.49 per cent. in 1919, and 2.64 per cent. in 1918. Probably most of these were Orientals. Adult males to the number of 1,003 were returned as receiving less than $12 a week. In the returns for 1920 only 153 adult males were mentioned as receiving these low wages.

Average Wage of Adult Males.

An estimate of the average wage for adult males in each industry was worked out last year on the basis of the classified weekly wage-rate. The method used was fully explained in the last annual report. It was pointed out that, in the questionnaire sent out, firms were asked to give the number of wage-earners within specified limits, but were not asked to give exact figures; so that the 5,798 wage-earners receiving "$24 to $24.99 weekly" will doubtless include some receiving $24, some $24.25, some $24.50, some $24.75, etc.; while the 9,934 who receive "$30 to $34.99 weekly" will be made up, in unknown proportions, of those receiving $30, $31, $32, $33, $34, etc. For the purpose of making an average it has been assumed, where steps of $1 were given in the table, that "$24 to $24.99," for example, meant $24.50, and, where steps of $5 were given, that "$30 to $34.99," for example, meant $32. Lest these assumptions should be criticized as erring a little on the side of generosity, "$50 and over" was taken in all cases to mean $50 only.

While strict accuracy cannot be guaranteed in the figures for either year, still, since the same method has been adopted in both cases, the comparison may be claimed as being entirely fair.

Average Wage in each Industry (Adult Males only).

Industry.	1919-20.	1921.
Breweries	$28 27	$28 67
Builders' material	31 65	28 82
Cigar and tobacco manufacture	32 48	23 97
Coal-mining	37 64	32 83
Coast shipping	26 81	28 45
Contracting	31 61	28 82
Explosives, chemicals, etc.	31 53	26 34
Food products (manufacture of)	29 72	25 67
Garment-making	36 14	29 38
House-furnishing	28 79	26 00
Manufacturing jewellery	34 20	33 54
Laundries, cleaning, dyeing	28 42	27 32
Manufacturing leather and fur goods	28 81	29 85
Lumber industries	32 47	24 70
Metal trades	31 14	30 33
Metal-mining	35 96	32 00
Miscellaneous trades and industries	28 24	28 40
Oil-refining	28 52	35 73
Paint-manufacture	27 23	24 14
Printing and publishing	35 79	36 30
Pulp and paper manufacturing	35 18	25 41
Ship-building	28 11	29 87
Smelting	36 44	31 98
Street-railways, gas, water, power, telephones, etc.	32 81	29 55
Manufacturing wood (not elsewhere specified)	27 46	23 48

These averages are worked out, of course, from the figures supplied by each firm for the week of employment of the greatest number, and represent the pay for a full week's work. Actual earnings would be subject to considerable deductions from these figures at certain periods of the year, whenever broken time is worked or a plant is closed down.

Striking a general average for all the above trades, and taking into account the respective numbers employed in them, we arrive at the following figures:—

Average Industrial Wage for All Adult Male Wage-earners, as computed from Returns.

1918 (January to July)	$27 97
1918–19	29 11
1919–20	31 51
1921	27 62

It will be seen that we have receded from the position gained during the prosperous times of 1919–20, and have returned to a little lower than the position of four years ago.

The figures given in relation to the weekly working-hours in the various industries do not show much change from last year. The general average is, indeed, a little lower—50.41 hours weekly as compared with 50.96; but some industries show slight increases and others slight decreases, without any pronounced change in either direction.

BIG INDUSTRIES IN THE PROVINCE.

Before leaving this section of the report it may be worth while to observe that the facts and figures collected do not tend to a pessimistic outlook, especially if one visualizes conditions as they may be after the present cycle of unrest has been safely passed. Certainly the leaders of industry have taken big chances on the future of the Province. Large sums of money have been spent to establish industries, and even in the last year of depression many businesses were being operated on a large scale. On going over the returns received, we find that, leaving out all public authorities and excluding also the transcontinental railways, wholesale and retail merchants, and deep-sea shipping, there were no fewer than 118 firms in the Province with a pay-roll for the year of over $100,000, and eleven of those passed the million mark. Of these 118 large firms, 47 were engaged in various branches of the lumbering industry, and others were in the following groups: Breweries, 2; coal-mining, 8; Coast shipping, 4; explosives, 1; contracting, 10; house-furnishing, 1; laundries, 1; builders' material, 2; manufacturing food products, 8; metal trades, 3; Provincial railways and public utilities, 8; manufacturing wood, 1; metal-mining, 6; miscellaneous, 1; oil-refining, 1; printing and publishing, 3; pulp and paper mills, 5; ship-building and repairing, 4; smelting, 2. Twenty-nine of these firms are located in the City of Vancouver.

CONTENTS OF TABLES.

With regard to the tables immediately following, the general headings of such tables are given hereunder and the trades included under each heading:—

No. 1. *Breweries.*—Under this heading are tabulated mineral-water manufacturers and breweries.

No. 2. *Builders' Material, etc.*—Includes manufacturers of brick, cut stone, Portland cement, lime, tiles, and firebrick; also stone-quarries and dealers in sand, gravel, and crushed rock.

No. 3. *Cigar and Tobacco Manufacturing.*—Comprises only these trades.

No. 4. *Coal-mining.*—This group contains also the operation of coke-ovens and coal-shipping docks.

No. 5. *Coast Shipping.*—Includes the operation of passenger and freight steamships, stevedoring, tug-boats (both general and towing logs), and river navigation, but does not include the operation of vessels in the offshore trade.

No. 6. *Contracting.*—Here are grouped building trades, painting and paper-hanging, plumbing and heating, and sheet-metal works; also contractors for industrial plants, structural-steel fabricating, railway-fencing, sewers, pipes and valves, dredging, pile-driving, wharves, bridges, roofing, and automatic sprinklers. Firms making return as building contractors, constructors of dry-kilns, refuse-burners, mills, brick-furnaces, electrical contractors, hardwood and sanitary floor-layers, and bricklayers.

No. 7. *Explosives, Chemicals, etc.*—Includes the manufacture of these commodities, also the manufacture of fertilizers.

No. 8. *Food Products, Manufacture of.*—This table includes bakeries, biscuit-manufacturers, cereal-milling, creameries and dairies, fish, fruit and vegetable canneries, packing-houses, curers of ham and bacon, blending of teas; also manufacturers of candy, macaroni, syrup, jams, pickles, sauces, coffee, catsup, and spices.

No. 9. *Garment-making.*—Includes tailoring, the manufacture of buttons, pleating, embroidery, etc., jute and cotton goods, shirts, overalls, knitted goods, millinery and ladies' outfitting.

No. 10. *House Furnishings.*—Comprises firms engaged in the manufacture of furniture, beds and bedding, springs and mattresses, upholstering, and carpet and linoleum laying.

No. 11. *Jewellery, Manufacture of.*—Includes the repair as well as manufacturing of jewellery and watches and optical instruments (where same is carried on in a factory).

No. 12. *Laundries, Cleaning and Dyeing.*—Includes these industries only.

No. 13. *Leather and Fur Goods, Manufacture of.*—Comprises manufacturers of boots, shoes, gloves, harness, trunks, and leather Indian novelties; also furriers and hide and wool dealers.

No. 14. *Lumber Industries.*—In this group are included logging, logging-railways, planing-mills, sawmills, shingle-mills, and lumber-dealers.

No. 15. *Metal Trades.*—This group includes marine blacksmithing, oxy-acetylene welding, boiler-making, iron and brass foundries, garages, vulcanizing, machine and pattern shops, galvanizing and electroplating; also manufacturers of handsaws, nuts and bolts, pumps, marine engines, mill machinery, and repairs to same.

No. 16. *Metal-mining.*—Includes all metalliferous mining.

No. 17. *Miscellaneous Trades and Industries.*—Here are grouped returns from trades which are not numerous enough to warrant special categories. They include manufacturers of soap, sails, tents, awning, brooms, paper boxes, and tin containers; also cold storage.

No. 18. *Oil-refining.*—Includes also the manufacture of fish-oil.

No. 19. *Paint-manufacturing.*—Includes also white-lead corroders and varnish-manufacturers.

No. 20. *Printing and Publishing.*—This table includes the printing and publishing of newspapers, job-printing, paper-ruling, bookbinding, engraving and embossing, blue-printing, lithographing, draughting and map-publishing, and the manufacture of rubber and metal stamps.

No. 21. *Pulp and Paper Manufacturing.*—Comprises only firms engaged in that industry.

No. 22. *Ship-building.*—Comprises both wooden- and steel-ship building and repairing, also construction and repair of small craft, and salvage.

No. 23. *Smelting.*—Comprises firms engaged exclusively in that industry.

No. 24. *Street-railways, Gas, Water, Power, etc.*—This group comprises generating and distribution of light and power, manufacture of gas, dissolved acetylene and oxygen; also includes gasolene lighting and heating devices, and supply of water to municipalities.

No. 25. *Wood, Manufacture of (not elsewhere specified).*—Here are grouped manufacturers of sash and doors, interior finish, water-proof ply-wood, veneer, store and office fittings, barrels, boxes, ships' knees, ready-cut buildings, wooden pipes and tanks, wooden pulleys, wooden toys, caskets, coffins, and undertakers' supplies.

BREWERIES.

Returns covering 21 Firms.

Salary and Wage Payments, 1921.

Officers, Superintendents, and Managers	$138,434 34
Clerks, Stenographers, Salesmen, etc.	59,351 00
Wage-earners (including piece-workers)	456,869 31
Total	$654,654 65

Average Number of Wage-earners.

Month.	Males.	Females.	Month.	Males.	Females.
January	281	3	July	280	6
February	283	3	August	282	7
March	294	2	September	275	4
April	302	3	October	231	4
May	288	3	November	231	2
June	310	7	December	218	2

Classified Weekly Wage-rates (Wage-earners only).

For Week of Employment of Greatest Number.	Males.		Females.		Apprentices.
	18 Yrs. & over.	Under 18 Yrs.	18 Yrs. & over.	Under 18 Yrs.	
Under $6.00					1
$ 6.00 to $ 6.99		1			
7.00 to 7.99		1			
8.00 to 8.99					
9.00 to 9.99	1				
10.00 to 10.99				1	
11.00 to 11.99					
12.00 to 12.99		6	1		
13.00 to 13.99					
14.00 to 14.99	4				
15.00 to 15.99	7	5	7		
16.00 to 16.99	7				
17.00 to 17.99					
18.00 to 18.99	1				
19.00 to 19.99					
20.00 to 20.99	8	1			
21.00 to 21.99	3				
22.00 to 22.99	12				
23.00 to 23.99	3	2			
24.00 to 24.99	32				
25.00 to 25.99	10				
26.00 to 26.99	47				
27.00 to 27.99	45				
28.00 to 28.99	50				
29.00 to 29.99	11				
30.00 to 34.99	41				
35.00 to 39.99	27				
40.00 to 44.99	15				
45.00 to 49.99	5				
50.00 and over	5				

Nationality of Employees.

Country of Origin.	Males.	Females.
Canada and Newfoundland	128	6
Great Britain and Ireland	156	2
United States of America	3	
Australasia	2	
Belgium	2	
France	6	
Italy	7	
Germany	2	
Austria	1	
Norway, Sweden, and Denmark	8	
Russia or other Slav country	5	
Other European country	3	
China		
Hindustan		
Japan		
All other countries		
Nationality not stated	31	

Weekly Hours of Labour.

6 at 44 hours.	114 at 50 hours.
8 at 45 "	4 at 53 "
15 at 46 "	3 at 54 "
191 at 48 "	17 at 56 "

BUILDERS' MATERIAL—PRODUCERS OF.

Returns covering 32 Firms.

Salary and Wage Payments, 1921.

Officers, Superintendents, and Managers	$102,969 81
Clerks, Stenographers, Salesmen, etc.	44,428 25
Wage-earners (including piece-workers)	618,254 10
Total	$765,652 16

Average Number of Wage-earners.

Month.	Males.	Females.	Month.	Males.	Females.
January	466	2	July	508	3
February	473	2	August	543	3
March	496	3	September	527	4
April	520	3	October	503	4
May	530	3	November	415	3
June	538	3	December	364	3

Classified Weekly Wage-rates (Wage-earners only).

For Week of Employment of Greatest Number.	Males.		Females.		Apprentices.
	18 Yrs. & over.	Under 18 Yrs.	18 Yrs. & over.	Under 18 Yrs.	
Under $6.00					
$ 6.00 to $ 6.99					
7.00 to 7.99					
8.00 to 8.99	1				
9.00 to 9.99					
10.00 to 10.99			1		
11.00 to 11.99					
12.00 to 12.99			1		
13.00 to 13.99					
14.00 to 14.99	1				
15.00 to 15.99					
16.00 to 16.99	7		1		
17.00 to 17.99	13	2			
18.00 to 18.99	37				
19.00 to 19.99	55				
20.00 to 20.99	15				
21.00 to 21.99	18				1
22.00 to 22.99	11				
23.00 to 23.99	5				
24.00 to 24.99	45		1		1
25.00 to 25.99	30				
26.00 to 26.99	23				
27.00 to 27.99	52				
28.00 to 28.99	22				
29.00 to 29.99	30				
30.00 to 34.99	93		1		
35.00 to 39.99	40				
40.00 to 44.99	35				
45.00 to 49.99	66				
50.00 and over	16				

Nationality of Employees.

Country of Origin.	Males.	Females.
Canada and Newfoundland	150	2
Great Britain and Ireland	225	1
United States of America	12	
Australasia		
Belgium		
France	2	
Italy	50	1
Germany		
Austria	1	
Norway, Sweden, and Denmark	1	
Russia or other Slav country	9	
Other European country	7	
China	148	
Hindustan		
Japan	1	
All other countries	2	
Nationality not stated		

Weekly Hours of Labour.

1 at 39 hours.	146 at 54 hours.
180 at 44 "	33 at 55 "
160 at 48 "	19 at 56 "
21 at 49 "	17 at 63 "
49 at 52 "	16 at 70 "

CIGAR AND TOBACCO MANUFACTURING.

Returns covering 8 Firms.

Salary and Wage Payments, 1921.

Officers, Superintendents, and Managers	$ 17,790 00
Clerks, Stenographers, Salesmen, etc.	15,677 45
Wage-earners (including piece-workers)	73,456 02
Total	$106,923 47

Average Number of Wage-earners.

Month.	Males.	Females.	Month.	Males.	Females.
January	23	2	July	25	63
February	91	9	August	23	16
March	94	21	September	22	20
April	20	2	October	24	103
May	79	15	November	29	100
June	76	14	December	29	105

Classified Weekly Wage-rates (Wage-earners only).

For Week of Employment of Greatest Number.	Males.		Females.		Apprentices.
	18 Yrs. & over.	Under 18 Yrs.	18 Yrs. & over.	Under 18 Yrs.	
Under $6.00		2			
$ 6.00 to $ 6.99		1	1		32
7.00 to 7.99		1			9
8.00 to 8.99		1			13
9.00 to 9.99	1				10
10.00 to 10.99		2			10
11.00 to 11.99		2			8
12.00 to 12.99					2
13.00 to 13.99					5
14.00 to 14.99			4		
15.00 to 15.99	4		1	1	
16.00 to 16.99	2		1	1	
17.00 to 17.99			3	1	
18.00 to 18.99			1		
19.00 to 19.99	2		1		
20.00 to 20.99			2		
21.00 to 21.99					
22.00 to 22.99	3				
23.00 to 23.99					
24.00 to 24.99					
25.00 to 25.99	3				
26.00 to 26.99					
27.00 to 27.99	1				
28.00 to 28.99	1				
29.00 to 29.99					
30.00 to 34.99	2				
35.00 to 39.99					
40.00 to 44.99					
45.00 to 49.99					
50.00 and over	2				

Nationality of Employees.

Country of Origin.	Males.	Females.
Canada and Newfoundland	18	50
Great Britain and Ireland	12	42
United States of America	4	34
Australasia		1
Belgium		
France		
Italy		3
Germany	1	
Austria		
Norway, Sweden, and Denmark	1	3
Russia or other Slav country		
Other European country		2
China		
Hindustan		
Japan		
All other countries	1	
Nationality not stated		

Weekly Hours of Labour.

3 at 40 hours.	108 at 45 hours.
19 at 44 "	12 at 48 "

COAL-MINING.

Returns covering 12 Firms.

Salary and Wage Payments, 1921.

Officers, Superintendents, and Managers	$ 349,764 63
Clerks, Stenographers, Salesmen, etc.	196,515 33
Wages-earners (including piece-workers)	8,714,864 73
Total	$ 9,261,144 69

Average Number of Wage-earners.

Month.	Males.	Females.	Month.	Males.	Females.
January	5,141	2	July	5,302	2
February	5,295	2	August	5,449	2
March	5,088	2	September	5,526	1
April	5,201	3	October	5,684	1
May	5,159	2	November	5,617	1
June	5,234	2	December	5,429	1

Classified Weekly Wage-rates (Wage-earners only).

For Week of Employment of Greatest Number.	Males.		Females.		Apprentices.
	18 Yrs. & over.	Under 18 Yrs.	18 Yrs. & over.	Under 18 Yrs.	
Under $6.00					
$ 6.00 to $ 6.99					
7.00 to 7.99					
8.00 to 8.99					5
9.00 to 9.99					
10.00 to 10.99		3			
11.00 to 11.99		34			
12.00 to 12.99	2	6			
13.00 to 13.99	117	2			2
14.00 to 14.99	20	9			
15.00 to 15.99	33	32	3		
16.00 to 16.99	52	7			
17.00 to 17.99	72	30			2
18.00 to 18.99	80	9			
19.00 to 19.99	67				
20.00 to 20.99	69	2			2
21.00 to 21.99	68	7			
22.00 to 22.99	46	2			
23.00 to 23.99	52	1			
24.00 to 24.99	62				
25.00 to 25.99	83				
26.00 to 26.99	111	1			
27.00 to 27.99	181				
28.00 to 28.99	180				
29.00 to 29.99	313				
30.00 to 34.99	766				
35.00 to 39.99	640				
40.00 to 44.99	513				
45.00 to 49.99	262				
50.00 and over	238				

Nationality of Employees.

Country of Origin.	Males.	Females.
Canada and Newfoundland	802	1
Great Britain and Ireland	2,415	
United States of America	110	1
Australasia	5	
Belgium	42	
France	20	
Italy	615	
Germany	13	
Austria	346	
Norway, Sweden, and Denmark	61	
Russia or other Slav country	309	
Other European country	31	
China	813	
Hindustan		
Japan	82	
All other countries		
Nationality not stated		

Weekly Hours of Labour.

10 at 30 hours.	15 at 49 hours.
10 at 40 "	51 at 56 "
5,622 at 48 "	

COAST SHIPPING.

Returns covering 79 Firms.

Salary and Wage Payments, 1921.

Officers, Superintendents, and Managers	$ 279,241 05
Clerks, Stenographers, Salesmen, etc.	368,891 66
Wage-earners (including piece-workers)	3,243,548 04
Total	$ 3,891,680 75

Average Number of Wage-earners.

Month.	Males.	Females.	Month.	Males.	Females.
January	3,004	43	July	3,016	49
February	2,925	43	August	3,090	51
March	2,899	45	September	3,360	49
April	2,801	46	October	3,201	47
May	3,148	47	November	2,982	44
June	3,177	47	December	3,341	44

Classified Weekly Wage-rates (Wage-earners only).

For Week of Employment of Greatest Number.	Males.		Females.		Apprentices.
	18 Yrs. & over.	Under 18 Yrs.	18 Yrs. & over.	Under 18 Yrs.	
Under $6.00					
$ 6.00 to $ 6.99					
7.00 to 7.99					
8.00 to 8.99		1			
9.00 to 9.99					
10.00 to 10.99		2			
11.00 to 11.99		1	3		
12.00 to 12.99	9	3			
13.00 to 13.99	17				
14.00 to 14.99	2				
15.00 to 15.99	23		6		
16.00 to 16.99	128				
17.00 to 17.99	72				
18.00 to 18.99	265		2		
19.00 to 19.99	16				
20.00 to 20.99	219				
21.00 to 21.99	137		1		
22.00 to 22.99	184		1		
23.00 to 23.99	245		21		
24.00 to 24.99	134		5		1
25.00 to 25.99	49		2		
26.00 to 26.99	55		1		
27.00 to 27.99	119				
28.00 to 28.99	437				
29.00 to 29.99	19				1
30.00 to 34.99	411		1		
35.00 to 39.99	319		1		
40.00 to 44.99	148				
45.00 to 49.99	93		1		
50.00 and over	156				

Nationality of Employees.

Country of Origin.	Males.	Females.
Canada and Newfoundland	1,192	15
Great Britain and Ireland	1,725	28
United States of America	99	2
Australasia	6	1
Belgium	5	
France	10	
Italy	26	
Germany	2	
Austria	1	
Norway, Sweden, and Denmark	72	1
Russia or other Slav country	9	
Other European country	1	
China	128	
Hindustan		
Japan	62	
All other countries		
Nationality not stated	250	

Weekly Hours of Labour.

565 at 32 hours.	83 at 56 hours.
3 at 42 "	126 at 60 "
123 at 44 "	2 at 63 "
1 at 46 "	4 at 70 "
1,716 at 48 "	21 at 72 "
11 at 49 "	7 at 84 "
95 at 54 "	

CONTRACTING.

Returns covering 517 Firms.

Salary and Wage Payments, 1921.

Officers, Superintendents, and Managers	$ 864,049 36
Clerks, Stenographers, Salesmen, etc	439,494 75
Wage-earners (including piece-workers)	5,498,064 70
Total	$6,801,608 81

Average Number of Wage-earners.

Month.	Males.	Females.	Month.	Males.	Females
January	3,402	62	July	5,209	70
February	3,360	67	August	5,345	70
March	3,768	70	September	4,981	68
April	4,145	71	October	4,551	68
May	4,652	67	November	4,401	66
June	4,744	69	December	3,947	59

Classified Weekly Wage-rates (Wage-earners only).

For Week of Employment of Greatest Number.	Males.		Females.		Apprentices.
	18 Yrs. & over.	Under 18 Yrs.	18 Yrs. & over.	Under 18 Yrs.	
Under $6.00	1	1			2
$ 6.00 to $ 6.99		3			3
7.00 to 7.99	2	3			7
8.00 to 8.99	3	29			6
9.00 to 9.99	1	25			2
10.00 to 10.99	13	37	4		5
11.00 to 11.99	4	5	1		1
12.00 to 12.99	31	11	3		2
13.00 to 13.99	33	3			
14.00 to 14.99	19	4	25		2
15.00 to 15.99	36	3	3		2
16.00 to 16.99	37	2	2		1
17.00 to 17.99	24	5	3		
18.00 to 18.99	394	6	1		
19.00 to 19.99	255				2
20.00 to 20.99	148		6		1
21.00 to 21.99	461		1		
22.00 to 22.99	590	1			
23.00 to 23.99	259	1			
24.00 to 24.99	1,046				
25.00 to 25.99	241		1		
26.00 to 26.99	206				
27.00 to 27.99	710				
28.00 to 28.99	191	1			
29.00 to 29.99	288				
30.00 to 34.99	924		1		
35.00 to 39.99	1,168				
40.00 to 44.99	509				
45.00 to 49.99	218				
50.00 and over	169				

Nationality of Employees.

Country of Origin.	Males.	Females.
Canada and Newfoundland	3,567	19
Great Britain and Ireland	3,394	28
United States of America	245	3
Australasia	6	1
Belgium	10	1
France	34	
Italy	301	2
Germany	8	
Austria	10	
Norway, Sweden, and Denmark	570	
Russia or other Slav country	57	1
Other European country	45	2
China	102	
Hindustan	2	
Japan	20	
All other countries	17	
Nationality not stated	68	1

Weekly Hours of Labour.

2 at 30 hours.	14 at 52 hours.
6 at 36 "	1,069 at 54 "
38 at 40 "	33 at 56 "
3,924 at 44 "	48 at 59 "
27 at 45 "	896 at 60 "
29 at 46 "	3 at 63 "
2,534 at 48 "	6 at 65 "
27 at 49 "	2 at 72 "
653 at 50 "	1 at 84 "

EXPLOSIVES, CHEMICALS, ETC.

Returns covering 16 Firms.

Salary and Wage Payments, 1921.

Officers, Superintendents, and Managers	$ 52,069 60
Clerks, Stenographers, Salesmen, etc	145,170 96
Wage-earners (including piece-workers)	275,415 55
Total	$472,656 11

Average Number of Wage-earners.

Month.	Males.	Females.	Month.	Males.	Females.
January	202	23	July fi	219	4
February	205	18	August	226	4
March	187	3	September	226	4
April	170	6	October	238	23
May	184	4	November	234	7
June	208	3	December	203	6

Classified Weekly Wage-rates (Wage-earners only).

For Week of Employment of Greatest Number.	Males.		Females.		Apprentices.
	18 Yrs. & over.	Under 18 Yrs.	18 Yrs. & over.	Under 18 Yrs.	
Under $6.00					
$ 6.00 to $ 6.99					
7.00 to 7.99					
8.00 to 8.99					
9.00 to 9.99					
10.00 to 10.99					
11.00 to 11.99			3		
12.00 to 12.99	2				
13.00 to 13.99	2				
14.00 to 14.99	1			1	
15.00 to 15.99	1		1		
16.00 to 16.99	28		1		
17.00 to 17.99	2				
18.00 to 18.99	10	2			
19.00 to 19.99	22			2	
20.00 to 20.99	11			1	
21.00 to 21.99	12		7		
22.00 to 22.99	23		5		
23.00 to 23.99	10				
24.00 to 24.99	35				
25.00 to 25.99	15		1		
26.00 to 26.99	9				
27.00 to 27.99	10				
28.00 to 28.99	7				
29.00 to 29.99	8				
30.00 to 34.99	60				
35.00 to 39.99	33				
40.00 to 44.99	7				
45.00 to 49.99	3				
50.00 and over					

Nationality of Employees.

Country of Origin.	Males.	Females.
Canada and Newfoundland	83	6
Great Britain and Ireland	112	11
United States of America	7	1
Australasia	2	
Belgium		
France	1	
Italy	1	
Germany		
Austria		
Norway, Sweden, and Denmark	6	1
Russia or other Slav country	2	
Other European country	1	
China	57	
Hindustan		
Japan	8	
All other countries	2	
Nationality not stated	29	3

Weekly Hours of Labour.

64 at 44 hours.	3 at 63 hours.
27 at 47 "	1 at 67 "
45 at 48 "	20 at 70 "
47 at 50 "	3 at 71 "
11 at 52 "	4 at 80 "
64 at 54 "	3 at 84 "
3 at 55 "	2 at 90 "
4 at 56 "	1 at 91 "
51 at 60 "	

FOOD PRODUCTS—MANUFACTURE OF.

Returns covering 216 Firms.

Salary and Wage Payments, 1921.

Officers, Superintendents, and Managers	$ 848,119 16
Clerks, Stenographers, Salesmen, etc.	968,825 86
Wage-earners (including piece-workers)	4,253,031 54
Total	$ 6,069,976 56

Average Number of Wage-earners.

Month.	Males.	Females.	Month.	Males.	Females.
January	1,966	388	July	3,958	1,082
February	2,009	404	August	4,125	1,375
March	2,248	380	September	3,915	1,482
April	2,594	404	October	3,412	1,283
May	2,786	437	November	2,597	762
June	3,606	789	December	2,136	528

Classified Weekly Wage-rates (Wage-earners only).

For Week of Employment of Greatest Number.	Males. 18 Yrs. & over.	Males. Under 18 Yrs.	Females. 18 Yrs. & over.	Females. Under 18 Yrs.	Apprentices.
Under $6.00	1	3	17	3	.....
$ 6.00 to $ 6.99	.....	.....	3	4	.....
7.00 to 7.99	1	5	13	15	.....
8.00 to 8.99	.....	4	10	5	.....
9.00 to 9.99	.....	7	13	36	.....
10.00 to 10.99	8	10	32	42	3
11.00 to 11.99	2	6	35	9	2
12.00 to 12.99	11	15	119	21	6
13.00 to 13.99	78	8	83	7	.....
14.00 to 14.99	38	11	263	7	.....
15.00 to 15.99	116	13	159	5	.....
16.00 to 16.99	46	8	81	11	.....
17.00 to 17.99	162	3	113	3	.....
18.00 to 18.99	249	18	163	5	.....
19.00 to 19.99	114	11	118	1	.....
20.00 to 20.99	177	3	160	.....	.....
21.00 to 21.99	341	2	56	.....	.....
22.00 to 22.99	224	.....	24	.....	.....
23.00 to 23.99	241	2	10	.....	.....
24.00 to 24.99	212	1	28	.....	.....
25.00 to 25.99	471	.....	16	.....	.....
26.00 to 26.99	219	.....	3	.....	.....
27.00 to 27.99	377	.....	11	.....	.....
28.00 to 28.99	152	.....	4	.....	.....
29.00 to 29.99	140	2	7	.....	.....
30.00 to 34.99	1,015	1	42	.....	.....
35.00 to 39.99	249	.....	7	.....	.....
40.00 to 44.99	104	.....	3	.....	.....
45.00 to 49.99	33	.....	.....	.....	.....
50.00 and over	40	.....	.....	.....	.....

Nationality of Employees.

Country of Origin.	Males.	Females.
Canada and Newfoundland	1,695	816
Great Britain and Ireland	1,407	362
United States of America	131	38
Australasia	2	2
Belgium	11	2
France	21	5
Italy	62	16
Germany	5	14
Austria	7	3
Norway, Sweden, and Denmark	169	7
Russia or other Slav country	43	1
Other European country	15	.....
China	580	.....
Hindustan	25	.....
Japan	487	59
All other countries	164	189
Nationality not stated	339	38

Weekly Hours of Labour.

65 at 30 hours.	150 at 47 hours.	50 at 56 hours.
33 at 36 "	1,665 at 48 "	2,442 at 60 "
11 at 40 "	354 at 49 "	25 at 66 "
6 at 42 "	205 at 50 "	146 at 72 "
305 at 44 "	105 at 51 "	15 at 77 "
124 at 45 "	814 at 54 "	2 at 84 "

GARMENT-MAKING.

Returns covering 49 Firms.

Salary and Wage Payments, 1921.

Officers, Superintendents, and Managers	$114,942 35
Clerks, Stenographers, Salesmen, etc.	88,244 21
Wage-earners (including piece-workers)	493,725 22
Total	$696,911 78

Average Number of Wage-earners.

Month.	Males.	Females.	Month.	Males.	Females.
January	155	360	July	168	378
February	151	361	August	170	387
March	164	353	September	179	425
April	168	391	October	181	422
May	171	391	November	179	412
June	171	385	December	168	388

Classified Weekly Wage-rates (Wage-earners only).

For Week of Employment of Greatest Number.	Males. 18 Yrs. & over.	Males. Under 18 Yrs.	Females. 18 Yrs. & over.	Females. Under 18 Yrs.	Apprentices.
Under $6.00	.....	1	.....	2	.....
$ 6.00 to $ 6.99	.....	.....	.....	2	.....
7.00 to 7.99	2	1	.....	7	.....
8.00 to 8.99	1	.....	3	3	.....
9.00 to 9.99	1	.....	1	1	7
10.00 to 10.99	6	1	11	6	5
11.00 to 11.99	.....	1	1	1	.....
12.00 to 12.99	1	.....	18	2	.....
13.00 to 13.99	1	.....	24	1	.....
14.00 to 14.99	4	.....	98	2	.....
15.00 to 15.99	7	.....	43	1	.....
16.00 to 16.99	5	.....	38	.....	.....
17.00 to 17.99	2	.....	18	.....	.....
18.00 to 18.99	5	.....	37	.....	.....
19.00 to 19.99	.....	.....	15	.....	.....
20.00 to 20.99	8	.....	26	.....	.....
21.00 to 21.99	7	.....	6	.....	.....
22.00 to 22.99	3	.....	24	.....	.....
23.00 to 23.99	2	.....	27	.....	.....
24.00 to 24.99	4	.....	2	.....	.....
25.00 to 25.99	12	.....	17	.....	.....
26.00 to 26.99	.....	.....	2	.....	.....
27.00 to 27.99	3	.....	3	.....	.....
28.00 to 28.99	.....	.....	.....	.....	.....
29.00 to 29.99	2	.....	.....	.....	.....
30.00 to 34.99	33	.....	4	.....	.....
35.00 to 39.99	34	.....	.....	.....	.....
40.00 to 44.99	16	1	.....	.....	.....
45.00 to 49.99	3	.....	.....	.....	.....
50.00 and over	9	.....	.....	.....	.....

Nationality of Employees.

Country of Origin.	Males.	Females.
Canada and Newfoundland	65	210
Great Britain and Ireland	64	207
United States of America	7	20
Australasia	1	.....
Belgium	1	3
France	.....	7
Italy	1	2
Germany	2	.....
Austria	3	.....
Norway, Sweden, and Denmark	11	4
Russia or other Slav country	9	6
Other European country	2	.....
China	21	.....
Hindustan	.....	.....
Japan	1	1
All other countries	2	3
Nationality not stated	.....	.....

Weekly Hours of Labour.

2 at 40 hours.	18 at 48 hours.
476 at 44 "	3 at 49 "
14 at 45 "	4 at 50 "
5 at 46 "	5 at 54 "
83 at 47 "	

HOUSE FURNISHINGS—MANUFACTURING OF.

Returns covering 14 Firms.

Salary and Wage Payments, 1921.

Officers, Superintendents, and Managers	$ 53,589 35
Clerks, Stenographers, Salesmen, etc.	34,128 02
Wage-earners (including piece-workers)	262,389 97
Total	$350,107 34

Average Number of Wage-earners.

Month.	Males.	Females.	Month.	Males.	Females.
January	184	23	July	193	23
February	217	22	August	198	24
March	215	25	September	201	25
April	229	25	October	211	22
May	240	25	November	211	21
June	224	24	December	213	21

Classified Weekly Wage-rates (Wage-earners only).

For Week of Employment of Greatest Number.	Males.		Females.		Apprentices.
	18 Yrs. & over.	Under 18 Yrs.	18 Yrs. & over.	Under 18 Yrs.	
Under $6.00					
$ 6.00 to $ 6.99					
7.00 to 7.99		1			
8.00 to 8.99		2			
9.00 to 9.99	7	2			
10.00 to 10.99	1	4			
11.00 to 11.99	1	3			
12.00 to 12.99	1				
13.00 to 13.99	3		1		
14.00 to 14.99	3		1		2
15.00 to 15.99	2	1			
16.00 to 16.99	9		5		
17.00 to 17.99	1	1	5		
18.00 to 18.99	5	1	5		
19.00 to 19.99	2	1			
20.00 to 20.99	2		1		
21.00 to 21.99	7	1	1		
22.00 to 22.99	11				
23.00 to 23.99	9		2		
24.00 to 24.99	20				
25.00 to 25.99	9		1		
26.00 to 26.99	9				
27.00 to 27.99	14				
28.00 to 28.99	17		1		
29.00 to 29.99	7				
30.00 to 34.99	57				
35.00 to 39.99	20				
40.00 to 44.99	9				
45.00 to 49.99	2				
50.00 and over					

Nationality of Employees.

Country of Origin.	Males.	Females.
Canada and Newfoundland	113	11
Great Britain and Ireland	105	14
United States of America	19	
Australasia	2	
Belgium		
France		
Italy		
Germany		
Austria		
Norway, Sweden, and Denmark	2	
Russia or other Slav country	1	
Other European country	1	
China	3	
Hindustan		
Japan		
All other countries		
Nationality not stated		

Weekly Hours of Labour.

140 at 44 hours.	108 at 50 hours.
21 at 48 "	2 at 54 "
3 at 49 "	

JEWELLERY—MANUFACTURING OF.

Returns covering 12 Firms.

Salary and Wage Payments, 1921.

Officers, Superintendents, and Managers	$ 28,739 00
Clerks, Stenographers, Salesmen, etc.	22,365 50
Wage-earners (including piece-workers)	123,364 59
Total	$174,469 09

Average Number of Wage-earners.

Month.	Males.	Females.	Month.	Males.	Females.
January	91	17	July	81	14
February	91	17	August	78	15
March	89	15	September	80	15
April	81	15	October	82	15
May	83	14	November	80	14
June	83	14	December	80	14

Classified Weekly Wage-rates (Wage-earners only).

For Week of Employment of Greatest Number.	Males.		Females.		Apprentices.
	18 Yrs. & over.	Under 18 Yrs.	18 Yrs. & over.	Under 18 Yrs.	
Under $6.00					
$ 6.00 to $ 6.99		2			1
7.00 to 7.99					1
8.00 to 8.99		1		2	2
9.00 to 9.99	1	2			
10.00 to 10.99	1		1		1
11.00 to 11.99					1
12.00 to 12.99		1			
13.00 to 13.99	1	3			
14.00 to 14.99	1				
15.00 to 15.99	2	1	1	2	1
16.00 to 16.99	1	1			
17.00 to 17.99			3		
18.00 to 18.99	2		2		
19.00 to 19.99		1	1		
20.00 to 20.99	1				
21.00 to 21.99			1		
22.00 to 22.99	3		2		
23.00 to 23.99	2	2			
24.00 to 24.99	1		1		
25.00 to 25.99	2				
26.00 to 26.99	2				
27.00 to 27.99	2				
28.00 to 28.99	1				
29.00 to 29.99					
30.00 to 34.99	9				
35.00 to 39.99	18				
40.00 to 44.99	15				
45.00 to 49.99	5				
50.00 and over	3				

Nationality of Employees.

Country of Origin.	Males.	Females.
Canada and Newfoundland	50	7
Great Britain and Ireland	35	6
United States of America	1	4
Australasia		
Belgium		
France		
Italy	2	
Germany		
Austria		
Norway, Sweden, and Denmark		
Russia or other Slav country		
Other European country		
China	1	
Hindustan		
Japan		
All other countries		
Nationality not stated		

Weekly Hours of Labour.

6 at 36 hours.	17 at 45 hours.
1 at 39 "	1 at 48 "
75 at 44 "	2 at 50 "

LAUNDRIES, CLEANING AND DYEING.

Returns covering 38 Firms.

Salary and Wage Payments, 1921.

Officers, Superintendents, and Managers	$ 71,430 09
Clerks, Stenographers, Salesmen, etc	91,225 90
Wage-earners (including piece-workers)	739,754 36
Total	$902,410 35

Average Number of Wage-earners.

Month.	Males.	Females.	Month.	Males.	Females.
January	309	590	July	320	594
February	312	581	August	320	579
March	317	584	September	323	588
April	317	590	October	323	572
May	317	589	November	323	578
June	321	585	December	322	570

Classified Weekly Wage-rates (Wage-earners only).

For Week of Employment of Greatest Number.	Males.		Females.		Apprentices.
	18 Yrs. & over.	Under 18 Yrs.	18 Yrs. & over.	Under 18 Yrs.	
Under $6.00	2				
$ 6.00 to $ 6.99					
7.00 to 7.99	2				
8.00 to 8.99		1			
9.00 to 9.99				10	
10.00 to 10.99	1	2	1	11	2
11.00 to 11.99	5		1	4	7
12.00 to 12.99	2	2	8	16	16
13.00 to 13.99	1	2	164	16	6
14.00 to 14.99			76	15	
15.00 to 15.99	4	1	82	3	
16.00 to 16.99	1		67		
17.00 to 17.99			28		
18.00 to 18.99	10		50		
19.00 to 19.99	18		2		
20.00 to 20.99	12		13		
21.00 to 21.99	2		2		
22.00 to 22.99	8		5		
23.00 to 23.99	3				
24.00 to 24.99	14		1		
25.00 to 25.99	45		1		
26.00 to 26.99	15				
27.00 to 27.99	35				
28.00 to 28.99	15				
29.00 to 29.99	6				
30.00 to 34.99	55				
35.00 to 39.99	33				
40.00 to 44.99	16				
45.00 to 49 99	2				
50.00 and over					

Nationality of Employees.

Country of Origin.	Males.	Females.
Canada and Newfoundland	95	243
Great Britain and Ireland	216	374
United States of America	7	25
Australasia	2	2
Belgium		2
France	1	6
Italy	3	5
Germany		1
Austria	1	
Norway, Sweden, and Denmark	1	20
Russia or other Slav country	1	9
Other European country		2
China	30	
Hindustan	1	
Japan	1	
All other countries	1	1
Nationality not stated		

Weekly Hours of Labour.

2 at 37 hours.	8 at 47 hours.	2 at 54 hours.
2 at 40 "	491 at 48 "	2 at 55 "
121 at 44 "	8 at 49 "	56 at 60 "
8 at 45 "	4 at 50 "	1 at 65 "
314 at 46 "		

LEATHER AND FUR GOODS—MANUFACTURING OF.

Returns covering 34 Firms.

Salary and Wage Payments, 1921.

Officers, Superintendents, and Managers	$ 51,817 93
Clerks, Stenographers, Salesmen, etc	38,442 24
Wage-earners (including piece-workers)	258,749 26
Total	$349,009 43

Average Number of Wage-earners.

Month.	Males.	Females.	Month.	Males.	Females.
January	207	57	July	195	48
February	206	55	August	151	37
March	216	57	September	152	40
April	214	59	October	180	46
May	225	61	November	217	70
June	219	56	December	217	71

Classified Weekly Wage-rates (Wage-earners only).

For Week of Employment of Greatest Number.	Males.		Females.		Apprentices.
	18 Yrs. & over.	Under 18 Yrs.	18 Yrs. & over.	Under 18 Yrs.	
Under $6.00		1			1
$ 6.00 to $ 6.99					
7.00 to 7.99		2		1	1
8.00 to 8.99		3		1	
9.00 to 9.99		5			2
10.00 to 10.99	1	3		1	
11.00 to 11.99		4	1	3	
12.00 to 12.99	1	4	7		1
13.00 to 13.99		2	4	1	
14.00 to 14.99	2		5		
15.00 to 15.99	2	2	9		
16.00 to 16.99	1	2	4		
17.00 to 17.99	2				
18.00 to 18.99	3		4		
19.00 to 19.99	2		7		
20.00 to 20.99	4				
21.00 to 21.99	2		1		
22.00 to 22.99	6		7		
23.00 to 23.99	3		1		
24.00 to 24.99	7		1		
25.00 to 25.99	18		3		
26.00 to 26.99	12		2		
27.00 to 27.99	15		1		
28.00 to 28.99	22		1		
29.00 to 29.99	1				
30.00 to 34.99	55		1		
35.00 to 39.99	24		1		
40.00 to 44.99	8				
45.00 to 49.99					
50.00 and over	7				

Nationality of Employees.

Country of Origin.	Males.	Females.
Canada and Newfoundland	85	35
Great Britain and Ireland	111	35
United States of America	10	
Australasia	2	
Belgium		
France	2	
Italy	5	
Germany	2	
Austria		
Norway, Sweden, and Denmark	7	3
Russia or other Slav country	3	
Other European country	3	
China	1	
Hindustan		
Japan	2	
All other countries		
Nationality not stated		

Weekly Hours of Labour.

2 at 43 hours.	160 at 48 hours.	2 at 52 hours.
49 at 44 "	4 at 49 "	4 at 53 "
1 at 45 "	56 at 50 "	5 at 54 "
11 at 47 "	3 at 51 "	

LUMBER INDUSTRIES.

Returns covering 533 Firms.

Salary and Wage Payments, 1921.

Officers, Superintendents, and Managers	$ 1,548,097 64
Clerks, Stenographers, Salesmen, etc.	829,739 39
Wage-earners (including piece-workers)	15,803,125 63
Total	$18,180,962 66

Average Number of Wage-earners.

Month.	Males.	Females.	Month.	Males.	Females.
January	10,062	44	July	15,407	66
February	10,682	52	August	14,763	58
March	13,052	64	September	14,493	57
April	14,232	79	October	14,530	59
May	15,234	79	November	14,126	58
June	15,417	73	December	12,143	55

Classified Weekly Wage-rates (Wage-earners only).

For Week of Employment of Greatest Number.	Males.		Females.		Apprentices.
	18 Yrs. & over.	Under 18 Yrs.	18 Yrs. & over.	Under 18 Yrs.	
Under $6.00					
$ 6.00 to $ 6.99	1	3			
7.00 to 7.99	1	4	3		
8.00 to 8.99	2	2	1		
9.00 to 9.99	138	7	2		
10.00 to 10.99	302	11	1		
11.00 to 11.99	333	3		1	
12.00 to 12.99	502	13	10		
13.00 to 13.99	436	14	5		
14.00 to 14.99	307		3		
15.00 to 15.99	887	27	1		
16.00 to 16.99	903	6	7		
17.00 to 17.99	969	3	2		
18.00 to 18.99	1,639	27	25		
19.00 to 19.99	607		9		
20.00 to 20.99	990	3	9		
21.00 to 21.99	1,907	6	7		
22.00 to 22.99	1,035	1	1		
23.00 to 23.99	490		1		
24.00 to 24.99	2,458	1	6		
25.00 to 25.99	1,180	2	6		
26.00 to 26.99	617		1		
27.00 to 27.99	1,325		1		
28.00 to 28.99	492				
29.00 to 29.99	534		2		
30.00 to 34.99	2,074	1	7		
35.00 to 39.99	2,133		1		
40.00 to 44.99	529				
45.00 to 49.99	268				
50.00 and over	319				

Nationality of Employees.

Country of Origin.	Males.	Females.
Canada and Newfoundland	7,512	62
Great Britain and Ireland	2,769	12
United States of America	1,332	9
Australasia	24	
Belgium	41	1
France	177	
Italy	279	
Germany	50	
Austria	247	
Norway, Sweden, and Denmark	1,857	7
Russia or other Slav country	745	2
Other European country	115	
China	3,376	
Hindustan	695	
Japan	1,843	3
All other countries	161	3
Nationality not stated	560	

Weekly Hours of Labour.

4 at 30 hours.	150 at 52 hours.	256 at 66 hours.
10 at 36 "	5,985 at 54 "	48 at 70 "
517 at 40 "	644 at 55 "	130 at 77 "
371 at 44 "	274 at 56 "	147 at 80 "
6,068 at 48 "	172 at 58 "	17 at 84 "
2,855 at 50 "	5,195 at 60 "	6 at 91 "

METAL TRADES.

Returns covering 292 Firms.

Salary and Wage Payments, 1921.

Officers, Superintendents, and Managers	$ 653,800 28
Clerks, Stenographers, Salesmen, etc.	688,054 54
Wage-earners (including piece-workers)	2,366,998 04
Total	$ 3,708,852 86

Average Number of Wage-earners.

Month.	Males.	Females.	Month.	Males.	Females.
January	2,212	32	July	1,820	48
February	2,147	34	August	1,867	36
March	2,059	30	September	1,751	35
April	1,932	31	October	1,777	34
May	1,913	32	November	1,671	36
June	1,970	34	December	1,755	31

Classified Weekly Wage-rates (Wage-earners only).

For Week of Employment of Greatest Number.	Males.		Females.		Apprentices.
	18 Yrs. & over.	Under 18 Yrs.	18 Yrs. & over.	Under 18 Yrs.	
Under $6.00		3		1	14
$ 6.00 to $ 6.99	1	2			7
7.00 to 7.99	1	13			6
8.00 to 8.99		11			13
9.00 to 9.99	6	12			9
10.00 to 10.99	10	15	3	1	7
11.00 to 11.99	3	15			14
12.00 to 12.99	13	12	1		5
13.00 to 13.99	5	11			13
14.00 to 14.99	10	3			2
15.00 to 15.99	19	14	4	1	13
16.00 to 16.99	28	3	2		4
17.00 to 17.99	19	1	4		12
18.00 to 18.99	27	7	3		9
19.00 to 19.99	17	1			6
20.00 to 20.99	45	1	4		4
21.00 to 21.99	34		5		6
22.00 to 22.99	78		3		4
23.00 to 23.99	80		3		4
24.00 to 24.99	160	3			1
25.00 to 25.99	91	2			1
26.00 to 26.99	103	2			1
27.00 to 27.99	75				2
28.00 to 28.99	124				
29.00 to 29.99	80		1		
30.00 to 34.99	434		5		
35.00 to 39.99	431		1		
40.00 to 44.99	99				
45.00 to 49.99	33				
50.00 and over	45				

Nationality of Employees.

Country of Origin.	Males.	Females.
Canada and Newfoundland	1,237	
Great Britain and Ireland	1,124	
United States of America	111	
Australasia	7	
Belgium	8	
France	7	
Italy	16	
Germany	2	
Austria	1	
Norway, Sweden, and Denmark	44	
Russia or other Slav country	11	
Other European country	4	
China	3	
Hindustan		
Japan	13	
All other countries	127	
Nationality not stated	8	

Weekly Hours of Labour.

6 at 30 hours.	33 at 45 hours.	165 at 51 hours.
3 at 32 "	48 at 46 "	118 at 54 "
5 at 36 "	46 at 47 "	9 at 60 "
15 at 40 "	140 at 48 "	1 at 63 "
13 at 42 "	59 at 49 "	2 at 70 "
1,672 at 44 "	47 at 50 "	2 at 77 "

METAL-MINING.

Returns covering 98 Firms.

Salary and Wage Payments, 1921.

Offices, Superintendents, and Managers	$ 244,615 55
Clerks, Stenographers, Salesmen, etc	124,482 65
Wage-earners (including piece-workers)	3,223,595 12
Total	$3,592,695 32

Average Number of Wage-earners.

Month.	Males.	Females.	Month.	Males.	Females.
January	1,750	22	July	2,213	25
February	1,747	21	August	2,365	25
March	1,812	21	September	2,209	25
April	1,818	21	October	2,157	26
May	1,870	27	November	2,164	26
June	2,084	26	December	2,003	26

Classified Weekly Wage-rates (Wage-earners only).

For Week of Employment of Greatest Number.	Males.		Females.		Apprentices.
	18 Yrs. & over.	Under 18 Yrs.	18 Yrs. & over.	Under 18 Yrs.	
Under $6.00					
$ 6.00 to $ 6.99					
7.00 to 7.99					
8.00 to 8.99					
9.00 to 9.99					
10.00 to 10.99					
11.00 to 11.99	1				
12.00 to 12.99	1				
13.00 to 13.99					
14.00 to 14.99					
15.00 to 15.99	2		3		
16.00 to 16.99	5		1		
17.00 to 17.99	11	3			
18.00 to 18.99	6	1	1		
19.00 to 19.99	29		8		1
20.00 to 20.99	9				
21.00 to 21.99	42		7		
22.00 to 22.99	203		5		
23.00 to 23.99	32		3		
24.00 to 24.99	137				
25.00 to 25.99	212		1		
26.00 to 26.99	165				
27.00 to 27.99	189				
28.00 to 28.99	107				
29.00 to 29.99	95				
30.00 to 34.99	520				
35.00 to 39.99	646				
40.00 to 44.99	273				
45.00 to 49.99	85				
50.00 and over	59				

Nationality of Employees.

Country of Origin.	Males.	Females.
Canada and Newfoundland	810	10
Great Britain and Ireland	591	11
United States of America	181	2
Australasia	9	
Belgium	3	
France	9	
Italy	158	
Germany	5	
Austria	32	
Norway, Sweden, and Denmark	230	4
Russia or other Slav country	132	
Other European country	20	
China	42	
Hindustan		
Japan	30	
All other countries	4	
Nationality not stated	465	

Weekly Hours of Labour.

2 at 44 hours.	1,112 at 56 hours.
796 at 48 "	15 at 60 "
2 at 49 "	12 at 70 "
55 at 52 "	6 at 84 "
246 at 54 "	

MISCELLANEOUS TRADES AND INDUSTRIES.

Returns covering 36 Firms.

Salary and Wage Payments, 1921.

Officers, Superintendents, and Managers	$ 144,729 28
Clerks, Stenographers, Salesmen, etc	139,536 30
Wage-earners (including piece-workers)	775,352 38
Total	$1,059,617 96

Average Number of Wage-earners.

Month.	Males.	Females.	Month.	Males.	Females.
January	470	76	July	486	108
February	486	86	August	494	114
March	483	90	September	485	110
April	469	92	October	488	110
May	504	95	November	487	115
June	430	90	December	473	104

Classified Weekly Wage-rates (Wage-earners only).

For Week of Employment of Greatest Number.	Males.		Females.		Apprentices.
	18 Yrs. & over.	Under 18 Yrs.	18 Yrs. & over.	Under 18 Yrs.	
Under $6.00				1	
$ 6.00 to $ 6.99					
7.00 to 7.99			2		
8.00 to 8.99	1	4		1	4
9.00 to 9.99		1			
10.00 to 10.99	1	3	1	4	1
11.00 to 11.99	1			7	
12.00 to 12.99	4	5	5		
13.00 to 13.99	1	3	10	5	
14.00 to 14.99	4	1	63		
15.00 to 15.99	2		12		
16.00 to 16.99	4		3		
17.00 to 17.99	4		6		
18.00 to 18.99	12	1	2		
19.00 to 19.99	4				
20.00 to 20.99	7		1		
21.00 to 21.99	11				
22.00 to 22.99	18		1		
23.00 to 23.99	19		1		
24.00 to 24.99	60		1		
25.00 to 25.99	60		2		
26.00 to 26.99	63				
27.00 to 27.99	58				
28.00 to 28.99	15				
29.00 to 29.99	16				
30.00 to 34.99	111		2		
35.00 to 39.99	46				
40.00 to 44.99	17				
45.00 to 49.99	3				
50.00 and over	10				

Nationality of Employees.

Country of Origin.	Males.	Females.
Canada and Newfoundland	200	44
Great Britain and Ireland	333	85
United States of America	21	2
Australasia		
Belgium		1
France	3	
Italy	7	4
Germany		
Austria		
Norway, Sweden, and Denmark	3	1
Russia or other Slav country		
Other European country	3	
China	4	
Hindustan	2	
Japan	4	
All other countries		1
Nationality not stated		

Weekly Hours of Labour.

1 at 39 hours.	87 at 47 hours.	19 at 56 hours.
7 at 40 "	142 at 48 "	50 at 60 "
2 at 42 "	26 at 50 "	3 at 63 "
211 at 44 "	4 at 51 "	8 at 72 "
15 at 45 "	8 at 52 "	1 at 84 "
3 at 46 "	164 at 54 "	1 at 87 "

OIL-REFINING.

Returns covering 6 Firms.

Salary and Wage Payments, 1921.

Officers, Superintendents, and Managers	$ 17,259 00
Clerks, Stenographers, Salesmen, etc.	135,336 47
Wage-earners (including piece-workers)	477,723 97
Total	$630,319 44

Average Number of Wage-earners.

Month.	Males.	Females.	Month.	Males.	Females.
January	388	1	July	259	1
February	303	1	August	229	
March	257	1	September	229	
April	253	1	October	234	
May	252	1	November	231	
June	260	1	December	238	1

Classified Weekly Wage-rates (Wage-earners only).

For Week of Employment of Greatest Number.	Males.		Females.		Apprentices.
	18 Yrs. & over.	Under 18 Yrs.	18 Yrs. & over.	Under 18 Yrs.	
Under $6.00					
$ 6.00 to $ 6.99					
7.00 to 7.99					
8.00 to 8.99					
9.00 to 9.99					
10.00 to 10.99					
11.00 to 11.99					
12.00 to 12.99	1				
13.00 to 13.99					
14.00 to 14.99	1				
15.00 to 15.99		1			
16.00 to 16.99					
17.00 to 17.99					
18.00 to 18.99	1	2			
19.00 to 19.99					
20.00 to 20.99	12				
21.00 to 21.99					
22.00 to 22.99	3	5	1		
23.00 to 23.99	1				
24.00 to 24.99	2				
25.00 to 25.99	14	1			
26.00 to 26.99					
27.00 to 27.99					
28.00 to 28.99					
29.00 to 29.99					
30.00 to 34.99	180				
35.00 to 39.99	64				
40.00 to 44.99	90				
45.00 to 49.99	31				
50.00 and over	10				

Nationality of Employees.

Country of Origin.	Males.	Females.
Canada and Newfoundland	164	1
Great Britain and Ireland	209	
United States of America	18	
Australasia	3	
Belgium		
France		
Italy	2	
Germany	1	
Austria	2	
Norway, Sweden, and Denmark	8	
Russia or other Slav country	7	
Other European country	1	
China		
Hindustan		
Japan		
All other countries		
Nationality not stated		

Weekly Hours of Labour.

5 at 44 hours.	308 at 48 hours.
3 at 45 "	1 at 49 "
6 at 46 "	8 at 66 "

PAINT-MANUFACTURING.

Returns covering 10 Firms.

Salary and Wage Payments, 1921.

Officers, Superintendents, and Managers	$ 48,493 52
Clerks, Stenographers, Salesmen, etc.	53,509 13
Wage-earners (including piece-workers)	94,315 80
Total	$196,318 45

Average Number of Wage-earners.

Month.	Males.	Females.	Month.	Males.	Females.
January	66	13	July	74	14
February	58	13	August	76	14
March	61	13	September	74	11
April	65	13	October	78	12
May	68	14	November	77	11
June	69	13	December	76	11

Classified Weekly Wage-rates (Wage-earners only).

For Week of Employment of Greatest Number.	Males.		Females.		Apprentices.
	18 Yrs. & over.	Under 18 Yrs.	18 Yrs. & over.	Under 18 Yrs.	
Under $6.00					
$ 6.00 to $ 6.99					
7.00 to 7.99					
8.00 to 8.99		3			
9.00 to 9.99		2			
10.00 to 10.99	1	2	1	1	
11.00 to 11.99		3			
12.00 to 12.99		5			
13.00 to 13.99		1		1	
14.00 to 14.99	1	1	5		
15.00 to 15.99	3	3	5		
16.00 to 16.99		3			
17.00 to 17.99	8				
18.00 to 18.99	2				
19.00 to 19.99			1		
20.00 to 20.99	2		1		
21.00 to 21.99	1				
22.00 to 22.99	3				
23.00 to 23.99	3				
24.00 to 24.99	7				
25.00 to 25.99	10				
26.00 to 26.99	3				
27.00 to 27.99	1				
28.00 to 28.99	3				
29.00 to 29.99	2				
30.00 to 34.99	7				
35.00 to 39.99	3				
40.00 to 44.99	1				
45.00 to 49.99					
50.00 and over	1				

Nationality of Employees.

Country of Origin.	Males.	Females.
Canada and Newfoundland	40	8
Great Britain and Ireland	45	6
United States of America	3	1
Australasia		
Belgium		
France		
Italy	1	
Germany		
Austria		
Norway, Sweden, and Denmark	1	
Russia or other Slav country		
Other European country		
China		
Hindustan		
Japan		
All other countries		
Nationality not stated		

Weekly Hours of Labour.

52 at 44 hours.	1 at 48 hours.
3 at 46 "	4 at 50 "
8 at 47 "	3 at 51 "

PRINTING AND PUBLISHING.

Returns covering 86 Firms.

Salary and Wage Payments, 1921.

Officers, Superintendents, and Managers	$ 323,272 77
Clerks, Stenographers, Salesmen, etc.	556,857 61
Wage-earners (including piece-workers)	1,192,071 60
Total	$2,072,201 98

Average Number of Wage-earners.

Month.	Males.	Females.	Month.	Males.	Females.
January	744	106	July	707	114
February	740	124	August	737	128
March	738	106	September	763	132
April	737	102	October	749	115
May	593	70	November	767	117
June	646	83	December	768	117

Classified Weekly Wage-rates (Wage-earners only).

For Week of Employment of Greatest Number.	Males.		Females.		Apprentices.
	18 Yrs. & over.	Under 18 Yrs.	18 Yrs. & over.	Under 18 Yrs.	
Under $6.00		6			3
$ 6.00 to $ 6.99		5			
7.00 to 7.99	13	7	1		5
8.00 to 8.99		12	1	6	11
9.00 to 9.99	1	7		1	3
10.00 to 10.99	4	11	1	2	5
11.00 to 11.99	1	6	7		
12.00 to 12.99	4	3	2	8	4
13.00 to 13.99	5	2	18		5
14.00 to 14.99	1	3	17	8	3
15.00 to 15.99	11	1	9	7	4
16.00 to 16.99	4	1	3		3
17.00 to 17.99	10	2	6		
18.00 to 18.99	14		11	3	6
19.00 to 19.99	7		13		
20.00 to 20.99	20	1	2	3	4
21.00 to 21.99	6		1		
22.00 to 22.99	9		2	2	2
23.00 to 23.99					
24.00 to 24.99	20		3		1
25.00 to 25.99	27				2
26.00 to 26.99	6				
27.00 to 27.99	12				2
28.00 to 28.99	3			1	
29.00 to 29.99	1				2
30.00 to 34.99	28				
35.00 to 39.99	73		1		
40.00 to 44.99	310				
45.00 to 49.99	68				
50.00 and over	33				

Nationality of Employees.

Country of Origin.	Males.	Females.
Canada and Newfoundland	444	93
Great Britain and Ireland	267	59
United States of America	37	2
Australasia	8	
Belgium		
France	1	1
Italy	1	
Germany		
Austria		
Norway, Sweden, and Denmark	3	
Russia or other Slav country	4	
Other European country		
China	8	
Hindustan		
Japan	22	2
All other countries	1	
Nationality not stated		

Weekly Hours of Labour.

1 at 36 hours.	95 at 45 hours.
1 at 39 "	206 at 48 "
6 at 43 "	3 at 49 "
129 at 44 "	

PULP AND PAPER—MANUFACTURE OF.

Returns covering 7 Firms.

Salary and Wage Payments, 1921.

Officers, Superintendents, and Managers	$ 157,675 99
Clerks, Stenographers, Salesmen, etc.	134,935 18
Wage-earners (including piece-workers)	3,898,857 34
Total	$4,191,468 51

Average Number of Wage-earners.

Month.	Males.	Females.	Month.	Males.	Females.
January	2,662	66	July	1,819	47
February	2,557	63	August	1,804	50
March	2,467	57	September	1,831	45
April	2,374	55	October	1,875	47
May	2,117	58	November	2,002	51
June	1,785	52	December	1,980	49

Classified Weekly Wage-rates (Wage-earners only).

For Week of Employment of Greatest Number.	Males.		Females.		Apprentices.
	18 Yrs. & over.	Under 18 Yrs.	18 Yrs. & over.	Under 18 Yrs.	
Under $6.00				1	
$ 6.00 to $ 6.99					
7.00 to 7.99					
8.00 to 8.99					
9.00 to 9.99					
10.00 to 10.99			2		
11.00 to 11.99					
12.00 to 12.99					
13.00 to 13.99	25				
14.00 to 14.99					
15.00 to 15.99	181		1		
16.00 to 16.99	41				
17.00 to 17.99	60		7		
18.00 to 18.99	83		3		
19.00 to 19.99	11				
20.00 to 20.99	2		8		
21.00 to 21.99	354				
22.00 to 22.99	80		8		
23.00 to 23.99			8		
24.00 to 24.99	240				
25.00 to 25.99	251		5		
26.00 to 26.99	67				
27.00 to 27.99	121		1		
28.00 to 28.99	60				
29.00 to 29.99	10				
30.00 to 34.99	194		3		
35.00 to 39.99	151		2		
40.00 to 44.99	101				
45.00 to 49.99	82				
50.00 and over	57				

Nationality of Employees.

Country of Origin.	Males.	Females.
Canada and Newfoundland	542	17
Great Britain and Ireland	449	15
United States of America	114	12
Australasia	7	
Belgium	2	
France	15	
Italy	99	
Germany	7	
Austria	17	
Norway, Sweden, and Denmark	87	
Russia or other Slav country	29	
Other European country	6	
China	119	
Hindustan	29	
Japan	667	5
All other countries		
Nationality not stated		

Weekly Hours of Labour.

6 at 44 hours.	131 at 56 hours.
570 at 48 "	752 at 60 "
569 at 54 "	120 at 72 "

SHIP-BUILDING.

Returns covering 31 Firms.

Salary and Wage Payments, 1921.

Officers, Superintendents, and Managers	$ 250,473 58
Clerks, Stenographers, Salesmen, etc.	224,937 35
Wage-earners (including piece-workers)	2,361,918 09
Total	$ 2,837,334 02

Average Number of Wage-earners.

Month.	Males.	Females.	Month.	Males.	Females.
January	2,322		July	1,525	
February	2,783		August	1,384	
March	2,291		September	1,346	
April	2,004		October	1,133	
May	1,916		November	893	
June	1,496		December	589	

Classified Weekly Wage-rates (Wage-earners only).

For Week of Employment of Greatest Number.	Males.		Females.		Apprentices.
	18 Yrs. & over.	Under 18 Yrs.	18 Yrs. & over.	Under 18 Yrs.	
Under $6.00	1				
$ 6.00 to $ 6.99					1
7.00 to 7.99					
8.00 to 8.99		1			
9.00 to 9.99					2
10.00 to 10.99	3				2
11.00 to 11.99	6	3			2
12.00 to 12.99		1			1
13.00 to 13.99	4	1			1
14.00 to 14.99	1	1			4
15.00 to 15.99	2	53			
16.00 to 16.99	1	2			
17.00 to 17.99	1				
18.00 to 18.99					
19.00 to 19.99	49				9
20.00 to 20.99	9	1			
21.00 to 21.99	57				
22.00 to 22.99	222				2
23.00 to 23.99	361				
24.00 to 24.99	595				
25.00 to 25.99	47				
26.00 to 26.99	96				
27.00 to 27.99	85				
28.00 to 28.99	34				
29.00 to 29.99	59				
30.00 to 34.99	744				
35.00 to 39.99	563				
40.00 to 44.99	83				
45.00 to 49.99	1				
50.00 and over	3				

Nationality of Employees.

Country of Origin.	Males.	Females.
Canada and Newfoundland	840	
Great Britain and Ireland	1,420	
United States of America	139	
Australasia	3	
Belgium	7	
France	26	
Italy	46	
Germany	9	
Austria	18	
Norway, Sweden, and Denmark	92	
Russia or other Slav country	7	
Other European country		
China		
Hindustan	1	
Japan	10	
All other countries	2	
Nationality not stated	527	

Weekly Hours of Labour.

2 at 40 hours.
3,075 at 44 "
23 at 48 "
9 at 50 hours.
7 at 54 "

SMELTING.

Returns covering 3 Firms.

Salary and Wage Payments, 1921.

Officers, Superintendents, and Managers	$ 155,024 94
Clerks, Stenographers, Salesmen, etc.	328,135 34
Wage-earners (including piece-workers)	2,489,252 16
Total	$ 2,972,412 44

Average Number of Wage-earners.

Month.	Males.	Females.	Month.	Males.	Females.
January	1,632	26	July	1,591	27
February	1,598	26	August	1,579	26
March	1,540	26	September	1,464	17
April	1,579	25	October	1,371	17
May	1,625	25	November	1,441	16
June	1,595	24	December	1,477	16

Classified Weekly Wage-rates (Wage-earners only).

For Week of Employment of Greatest Number.	Males.		Females.		Apprentices.
	18 Yrs. & over.	Under 18 Yrs.	18 Yrs. & over.	Under 18 Yrs.	
Under $6.00					
$ 6.00 to $ 6.99					
7.00 to 7.99					
8.00 to 8.99					
9.00 to 9.99					
10.00 to 10.99					
11.00 to 11.99					
12.00 to 12.99					
13.00 to 13.99					
14.00 to 14.99	2	2			
15.00 to 15.99	1				
16.00 to 16.99	1				
17.00 to 17.99	2	5			5
18.00 to 18.99		1			
19.00 to 19.99	1		22		
20.00 to 20.99	5		3		
21.00 to 21.99					3
22.00 to 22.99	18		2		
23.00 to 23.99					
24.00 to 24.99	2				2
25.00 to 25.99					
26.00 to 26.99	223				
27.00 to 27.99	102				
28.00 to 28.99	207				1
29.00 to 29.99	290				
30.00 to 34.99	336				
35.00 to 39.99	303				
40.00 to 44.99	97				
45.00 to 49.99	50				
50.00 and over	13				

Nationality of Employees.

Country of Origin.	Males.	Females.
Canada and Newfoundland	392	14
Great Britain and Ireland	668	10
United States of America	92	3
Australasia	7	
Belgium	5	
France	6	
Italy	235	
Germany	5	
Austria	58	
Norway, Sweden, and Denmark	81	
Russia or other Slav country	63	
Other European country	17	
China	44	
Hindustan		
Japan		
All other countries		
Nationality not stated		

Weekly Hours of Labour.

27 at 48 hours.
2 at 50 "
1,545 at 56 hours.

STREET RAILWAYS, GAS, POWER, TELEPHONE, ETC.

Returns covering 66 Firms.

Salary and Wage Payments, 1921.

Officers, Superintendents, and Managers	$ 498,015 21
Clerks, Stenographers, Salesmen, etc	1,293,939 64
Wage-earners (including piece-workers)	6,706,814 70
Total	$8,498,769 55

Average Number of Wage-earners.

Month.	Males.	Females.	Month.	Males.	Females.
January	3,576	1,071	July	4,037	1,078
February	3,566	1,072	August	3,926	1,068
March	3,644	1,074	September	3,861	1,067
April	3,790	1,062	October	3,906	1,058
May	3,891	1,072	November	4,157	1,051
June	4,024	1,064	December	4,105	1,047

Classified Weekly Wage-rates (Wage-earners only).

For Week of Employment of Greatest Number.	Males.		Females.		Apprentices.
	18 Yrs. & over.	Under 18 Yrs.	18 Yrs. & over.	Under 18 Yrs.	
Under $6.00	3				
$ 6.00 to $ 6.99	1				
7.00 to 7.99					
8.00 to 8.99	2				2
9.00 to 9.99					
10.00 to 10.99	3				
11.00 to 11.99	3	1	4	2	8
12.00 to 12.99	8				202
13.00 to 13.99	20		4		50
14.00 to 14.99	11				
15.00 to 15.99	27	1	335	28	
16.00 to 16.99	2		190	13	
17.00 to 17.99	37	1	36		
18.00 to 18.99	92		49	1	
19.00 to 19.99	51		17		
20.00 to 20.99	8		71		
21.00 to 21.99	105		39		
22.00 to 22.99	208		22		
23.00 to 23.99	67	1	2		
24.00 to 24.99	421				
25.00 to 25.99	245		1		
26.00 to 26.99	378				
27.00 to 27.99	260				
28.00 to 28.99	87				
29.00 to 29.99	105				
30.00 to 34.99	1,677				
35.00 to 39.99	492				
40.00 to 44.99	206				
45.00 to 49.99	32				
50.00 and over	19				

Nationality of Employees.

Country of Origin.	Males.	Females.
Canada and Newfoundland	1,625	565
Great Britain and Ireland	2,817	554
United States of America	184	37
Australasia	20	7
Belgium	2	
France	11	4
Italy	125	
Germany	7	
Austria	15	
Norway, Sweden, and Denmark	70	6
Russia or other Slav country	8	
Other European country	6	
China	64	
Hindustan	1	
Japan		
All other countries	8	1
Nationality not stated		

Weekly Hours of Labour.

7 at 36 hours.	1,687 at 48 hours.	14 at 55 hours.
1 at 40 "	212 at 50 "	95 at 56 "
841 at 42 "	16 at 52 "	94 at 60 "
2,097 at 44 "	100 at 53 "	1 at 72 "
50 at 45 "	369 at 54 "	

WOOD—MANUFACTURE OF (N.E.S.).

Returns covering 59 Firms.

Salary and Wage Payments, 1921.

Officers, Superintendents, and Managers	$187,049 63
Clerks, Stenographers, Salesmen, etc	204,053 87
Wage-earners (including piece-workers)	913,072 32
Total	$1,304,175 82

Average Number of Wage-earners.

Month.	Males.	Females.	Month.	Males.	Females.
January	796	13	July	1,084	29
February	801	15	August	1,059	28
March	809	15	September	1,063	42
April	817	14	October	990	30
May	870	14	November	939	35
June	1,044	16	December	891	20

Classified Weekly Wage-rates (Wage-earners only).

For Week of Employment of Greatest Number.	Males.		Females.		Apprentices.
	18 Yrs. & over.	Under 18 Yrs.	18 Yrs. & over.	Under 18 Yrs.	
Under $6.00	7	1		1	
$ 6.00 to $ 6.99		1			
7.00 to 7.99		2			
8.00 to 8.99	2	10			
9.00 to 9.99	14	2			3
10.00 to 10.99	30	4	14		2
11.00 to 11.99	35	4	2	2	
12.00 to 12.99	9	14	4		
13.00 to 13.99	15	6	1		3
14.00 to 14.99	66	2	6		2
15.00 to 15.99	16	3	2		3
16.00 to 16.99	46	1			
17.00 to 17.99	89	6	1		
18.00 to 18.99	48		4		
19.00 to 19.99	60				
20.00 to 20.99	31				1
21.00 to 21.99	37	4			
22.00 to 22.99	85		1		
23.00 to 23.99	37				
24.00 to 24.99	54				
25.00 to 25.99	40				
26.00 to 26.99	42				
27.00 to 27.99	89		1		
28.00 to 28.99	23				
29.00 to 29.99	66				
30.00 to 34.99	108				
35.00 to 39.99	91				
40.00 to 44.99	15				
45.00 to 49.99	17				
50.00 and over	10				

Nationality of Employees.

Country of Origin.	Males.	Females.
Canada and Newfoundland	509	22
Great Britain and Ireland	336	11
United States of America	47	1
Australasia	1	
Belgium	2	
France	1	
Italy	6	
Germany	2	
Austria	4	
Norway, Sweden, and Denmark	32	2
Russia or other Slav country	8	1
Other European country		
China	146	
Hindustan	28	
Japan	35	
All other countries	25	
Nationality not stated	55	

Weekly Hours of Labour.

6 at 36 hours.	73 at 49 hours.	3 at 56 hours.
431 at 44 "	121 at 50 "	2 at 65 "
4 at 46 "	166 at 54 "	2 at 72 "
90 at 48 "	58 at 55 "	

SUMMARY OF ALL TABLES.

Returns covering 2,275 Firms.

The information grouped in the twenty-five tables in the foregoing pages is summarized in the general table hereunder. It is analysed at some length in the introductory portion of the Report on Statistics of Trades and Industries. The firms whose returns are here dealt with include the principal employers in the industrial groups which have been covered, but do not, of course, comprise all the industrial employers in the Province. However, the conditions here shown as to wages, working-hours, nationality, and fluctuation of employment may fairly be taken as typical.

Total Salary and Wage Payments during Twelve Months ending 31st December, 1921:—

Officers, Superintendents, and Managers	$ 7,201,474 96
Clerks, Stenographers, Salesmen, etc.	7,226,280 60
Wage-earners (including piece-workers)	65,314,624 54
Total	$79,742,380 10

Average Number of Wage-earners.

During the Month of	Males.	Females.
January	42,111	3,042
February	43,086	3,091
March	45,288	3,057
April	46,830	3,113
May	48,715	3,145
June	49,731	3,474
July	50,496	3,893
August	50,283	4,117
September	49,336	4,266
October	48,109	4,118
November	46,471	3,596
December	43,165	3,289

Nationality of Employees.

Country of Origin.	Males.	Females.
Canada and Newfoundland	22,322	2,249
Great Britain and Ireland	21,005	1,843
United States of America	2,932	196
Australasia	119	14
Belgium	141	10
France	355	23
Italy	2,051	33
Germany	123	15
Austria	764	3
Norway, Sweden, and Denmark	3,417	60
Russia or other Slav country	1,462	20
Other European country	281	6
China	5,691	.....
Hindustan	784	.....
Japan	3,288	70
All other countries	516	198
Nationality not stated	2,332	42

Classified Weekly Wage-rates (Wage-earners only.)

For Week of Employment of Greatest Number.	Males.		Females.		Apprentices.
	18 Yrs. & over.	Under 18 Yrs.	18 Yrs. & over.	Under 18 Yrs.	
Under $6.00	15	18	17	9	21
$ 6.00 to $ 6.99	3	18	4	6	44
7.00 to 7.99	22	40	19	23	29
8.00 to 8.99	11	85	15	18	56
9.00 to 9.99	171	73	16	39	38
10.00 to 10.99	386	110	69	73	43
11.00 to 11.99	395	91	58	29	45
12.00 to 12.99	602	102	178	47	237
13.00 to 13.99	764	58	314	34	85
14.00 to 14.99	499	37	566	33	15
15.00 to 15.99	1,388	161	687	48	23
16.00 to 16.99	1,359	36	406	25	8
17.00 to 17.99	1,540	62	232	4	19
18.00 to 18.99	2,985	75	364	9	15
19.00 to 19.99	1,389	13	205	3	18
20.00 to 20.99	1,814	12	307	4	12
21.00 to 21.99	3,612	20	135	.....	10
22.00 to 22.99	3,088	9	114	2	8
23.00 to 23.99	1,924	9	79	.....	4
24.00 to 24.99	5,798	5	49	.....	6
25.00 to 25.99	3,165	5	57	.....	3
26.00 to 26.99	3,471	3	9	.....	1
27.00 to 27.99	3,881	.....	18	.....	4
28.00 to 28.99	2,250	1	6	1	1
29.00 to 29.99	2,083	2	10	.....	3
30.00 to 34.99	9,934	2	67	.....	.....
35.00 to 39.99	7,601	.....	14	.....	.....
40.00 to 44.99	3,214	1	3	.....	.....
45.00 to 49.99	1,359	.....	1	.....	.....
50.00 and over	1,224	.....	.....	.....	.....

Weekly Hours of Labour.

87 at 30 hours.	428 at 46 hours.	754 at 55 hours.	102 at 70 hours.
568 at 32 "	420 at 47 "	3,436 at 56 "	3 at 71 "
74 at 36 "	22,694 at 48 "	172 at 58 "	300 at 72 "
2 at 37 "	584 at 49 "	48 at 59 "	147 at 77 "
4 at 39 "	4,469 at 50 "	9,686 at 60 "	151 at 80 "
608 at 40 "	280 at 51 "	29 at 63 "	37 at 84 "
865 at 42 "	305 at 52 "	9 at 65 "	1 at 87 "
8 at 43 "	108 at 53 "	289 at 66 "	2 at 90 "
13,523 at 44 "	9,827 at 54 "	1 at 67 "	7 at 91 "
503 at 45 "			

PROVINCIAL EMPLOYMENT SERVICE.

A review of the work of the Provincial Government branch of the Employment Service of Canada for the year ended December 31st, 1921, is given in the following pages. This branch of the Service is administered by the Provincial Department of Labour. Despite the depression which has prevailed throughout the whole period in this as in all parts of Canada and the world, the Employment Service in British Columbia has steadily strengthened its position in the industrial life of the Province.

The Service is operated under an agreement between the Federal and Provincial Governments, the terms of which provide for an equal division of the cost. The value of the arrangement to this Province has never been better exemplified than during the period under review. Before the organization of this Service workmen who were unemployed and in search of employment wasted a good deal of their substance in travelling from place to place in search of work, owing to the lack of accurate information regarding conditions in different parts of the country; but through the excellent system of reports of local labour conditions now in force it is possible for a workman to ascertain the conditions at any point where the Department has a branch in the Province at any time, and the information is never more than a few days old. The same information can be had covering all of the Provinces, except that it is older as the distance increases. This system is becoming better known, and hundreds of workmen have been saved large amounts that would have been expended in fruitless journeys had they not secured the information that conditions where they intended going were no better, and probably worse, than in their present location. A further result of this co-operation was the placing in employment in the adjoining Province of 6,908 men from this Province, and the handling for the first time of harvest labour in this manner.

ORGANIZATION FOR RELIEF PURPOSES.

The activities of the Employment Service have been widened during the period by its being entrusted with the work of certifying men who are unemployed for relief purposes. This has required the issue of somewhat over 65,000 certificates and the checking of the same number of vouchers in connection with the disbursement of relief, the expense of which has been divided between the municipal, Provincial, and Federal authorities and paid on the certificates of employment officials.

Closer affiliation has also been effected between the Employment Service and the Department of Immigration and Soldiers' Civil Re-establishment. This has assisted to some extent in securing for disabled returned soldiers and citizens positions that would otherwise have gone to aliens.

The number of offices operated has been reduced from seventeen to sixteen, the office at Grand Forks becoming vacant through resignation, and owing to changed industrial conditions in that district the vacancy has not been filled.

APPLICANTS AND PLACEMENTS.

The following tables show the business transacted by the Employment Service for the period under review, both by months and by offices. Four offices show an increase in business—namely, Cranbrook, Fernie, Kelowna, and the Women's Office in Victoria. All the balance of the offices show a decrease, the heaviest being in the Powell Street Office, Vancouver, which handles men engaged in lumbering, logging, railroad, mining, and general labouring. This group of industries alone absorbed approximately 20,000 fewer workers than during the previous year.

The number of applicants for employment increased from 93,424 to 99,240, but employers' orders dropped from 72,915 to 38,079, a reduction of almost 50 per cent. Many employers had their requirements met by applicants applying personally, thus rendering it unnecessary for them to place orders with the Service, this being due to the exceptionally large number of persons unemployed during the year.

Total of Year's Business by Districts.

Office.	Applications.	Employers' Orders.	Placements in B.C.	Placed other Provinces.	Total, 1921.
Cranbrook	3,351	3,153	2,333	43	2,376
Fernie	1,120	1,183	1,181	3	1,184
Grand Forks (7½ months)	535	338	319	1	320
Kamloops	2,850	1,965	1,821	14	1,835
Kelowna	729	477	463	5	468
Nanaimo	886	270	263	39	302
Nelson	2,478	1,733	1,656	124	1,780
New Westminster	3,698	1,496	1,452	363	1,815
Prince George	1,053	870	856	31	887
Prince Rupert	3,146	1,588	1,531	6	1,537
Revelstoke	1,638	593	561	50	611
Vancouver (Richards Street)	24,780	3,427	3,176	3,072	6,248
Vancouver (Powell Street)	27,703	9,346	8,911	2,089	11,000
Vancouver (Women)	8,312	4,592	3,880	123	4,003
Vernon	2,272	1,443	1,349	34	1,383
Victoria	11,205	2,901	2,887	897	3,784
Victoria (Women)	3,484	2,704	2,197	14	2,211
Totals	99,240	38,079	34,836	6,908	41,744

Total of Year's Business by Months.

Month.	Applications.	Employers' Orders.	Placements in B.C.	Placed other Provinces.	Total, 1921.
January	9,010	2,812	2,640	....	2,640
February	7,488	2,840	2,709	11	2,720
March	5,787	2,680	2,558	131	2,689
April	6,717	3,609	3,356	1,215	4,571
May	5,325	3,362	3,221	136	3,357
June	6,114	3,831	3,380	18	3,398
July	7,406	4,652	4,450	76	4,526
August	12,674	3,499	3,058	4,738	7,796
September	6,907	3,265	2,752	575	3,327
October	8,531	3,363	2,914	6	2,920
November	8,659	2,005	1,893	....	1,893
December	14,622	2,161	1,905	2	1,907
Totals	99,240	38,079	34,836	6,908	41,744

UNEMPLOYMENT PROBLEMS.

Through climatic conditions the Coast cities have always been a Mecca for the unemployed of Western Canada, and the situation has been further complicated since the war by the large number of handicapped soldiers who have for various reasons located in Vancouver and Victoria. These total such a number that a Province with so little manufacturing, comparatively speaking, finds itself unable to absorb them into industry.

During the winter of 1920–21 the number of unemployed was considerably increased through the general slackening of industry throughout Canada, and so acute did the problem become in the principal cities that the Federal Government announced a plan of relief whereby it would, provided the Province and municipalities agreed, assume one-third of the cost of relief measures adopted by cities and municipalities. The Provincial Government having approved of the plan, a number of cities and municipalities took advantage of it. The Employment Service was utilized in carrying out the details, one of the rules being that before relief could be granted the applicant must first secure a certificate from the nearest office to the effect that the applicant had applied for work and that none was available. On the backs of the certificates the municipal officers entered the relief given and obtained the signature of the applicant, returning these certificates to the Department as vouchers with the accounts. Over 65,000 of these certificates were issued and checked as vouchers, all but 5,000 being issued by the Vancouver offices.

WORK AS A CONDITION OF RELIEF.

The plan originally did not permit that those receiving relief could be utilized to perform useful work for the municipalities, but owing to the abnormal number of applicants it was felt that a considerable number would vanish if required to work, and the Minister of Labour was able to secure a modification of the plan permitting municipal officials to require two days' work

each week from those in receipt of relief. This greatly reduced the number of applicants and effected a material saving in the funds available for the relief of distress due to unemployment.

During the winter of 1921–22 the City of Vancouver adopted a new plan of handling single men who were unemployed. These had previously been housed in rooming-houses and fed in restaurants, but under the new arrangement a number of large buildings owned by the city were turned into a camp, and single men applying for relief found to be free from disease were required to live in and comply with the rules laid down for the government of the camp. This plan worked out very satisfactorily, the men being well fed and housed at a greatly reduced cost, and the number of applicants being also reduced to one-half the number who applied for relief during the previous winter.

EFFORTS TO RELIEVE SITUATION.

In an effort to relieve the situation, officials of the Service attending a conference of Western Province Employment Offices were able to make an arrangement with the officers of the Alberta and Saskatchewan Services to take available men for spring ploughing and seeding, and by this means some 1,600 men were sent from the Province to assured positions on the Prairies. The month of July still found the unemployed very numerous, and acting on instructions from the Minister an officer was sent to Winnipeg to endeavour to arrange for the application of harvester rates from the West at the same time as men were being brought from the East. The officers of the Employment Service in the Prairie Provinces co-operated with the representative of British Columbia, and a rate of $10 was secured from Vancouver to Edmonton and Calgary, with an additional charge of ½ cent per mile to more easterly points, the rate from Victoria being $1 in excess of the rate from Vancouver. The same rates also applied to the return journey. For the first time the additional labour required for the harvest was secured through the Employment Service offices in the Province, and the manner in which it was handled is likely to be a considerable factor in putting this work into the hands of the Employment Service in the Eastern Provinces. Approximately 5,000 men were sent to positions at a guaranteed minimum wage of $4 and board, practically all going to points in Saskatchewan, the officers of that Province estimating that an average of fifty days' work could be secured. Unprecedented weather conditions interfered with the complete success of the enterprise, but the number of complaints received was so small that the movement can be said to have been a complete success, except for the adverse weather conditions which prevailed in some districts. Every man sent was assured of definite employment at a guaranteed wage-rate, and the Saskatchewan Employment Service officials carried out every undertaking made.

Reference has already been made to the service rendered to workers by advising them of conditions in different parts of the country. A considerable number of harvesters, however, went to districts where no men were required, although they were strongly advised against doing so and refused the reduced rates, and they found on arrival at the points selected by themselves that the information supplied by our officers was reliable and should have been followed.

As a result of the placement of 6,600 men in the harvest-fields, including the 1,600 who went in the spring, the unemployment situation throughout the Province was considerably improved. The men secured employment; the farmers received the required help; and the charge on the country for relief was greatly reduced.

CO-OPERATION WITH OTHER DEPARTMENTS.

By an arrangement between the Employment Service and the Immigration Department, every employer making application to import labour from foreign countries is referred to the Employment Service, and if suitable labour can be obtained in Canada permission to bring in aliens is refused. The adoption of this policy has resulted in this Service filling a large number of positions with citizens which would have been filled with aliens imported for the purpose. Where aliens are found by our officers to be in Canada illegally, the cases are taken up with the immigration officers, and those deported are replaced by citizens; more than 100 of these cases having been dealt with during the year, due largely to the hearty co-operation of the immigration officials with our officers.

The Service has, in view of the large number of partially disabled returned men available for employment, been co-operating with the Department of Soldiers' Civil Re-establishment in an endeavour to find employment for these men, and the officers of that Department assist in

placing a great many men through the activities of members of the outside staff, who locate positions suitable for handicapped men and co-operate with this Service in filling such orders. By the combined efforts of the two departments very few opportunities of placing handicapped men in employment are overlooked, and whenever any of these men are able to secure employment in the other Provinces every possible assistance is given to them to reach the place where the employment is being offered. The nature of the principal industries in this Province makes it extremely difficult to absorb handicapped men, and the co-operation of employers throughout the Province will be necessary if employment is to be found for the handicap cases who have made their homes here.

EFFECTS OF LEGISLATION.

The "Employment Agencies Act Repeal Act" of 1919, which makes it an offence to receive remuneration for directing workmen to employment, has almost entirely abolished the system of charging workmen for this service. Only one instance was discovered during the period, and this was a case where the employment agent of a large contracting firm which secures its help through the Employment Service had charged a number of Italians from $3 to $5 for employment, and had then directed them to the Government Employment Office to be engaged. By direction of officers of the Employment Service, the agent was charged with a breach of the Statute, and on his appearance pleaded guilty and was fined $15 and costs.

A number of private agencies are still being maintained by employers, but the provisions of the "Employment Agencies Act Repeal Act Amendment Act," which requires a report of their activities to be made monthly, has given the Service a considerable amount of information which is being used to advantage in dealing with this question. This Act, in addition to providing for reports from private agencies, definitely included school-teachers in the class covered by the Act of 1919, and this has resulted in the discontinuance of an agency which dealt exclusively with this class of employment and charged teachers 3 per cent. of one year's salary, in addition to other charges for registration, for putting them in touch with School Boards having vacancies to be filled.

THE SERVICE AN INDUSTRIAL BAROMETER.

In addition to supplying employers with labour and workers with employment, the Service has widened its influence and is now looked upon as a barometer of industrial conditions; and our officers are freely consulted by individual workmen, labour organizations, employers and their organizations, bankers, municipal officials, and others who desire information regarding industrial conditions in any part of the country. Originally an experiment, the Employment Service has grown to be an essential factor in the industrial life of the country, and its service is highly regarded generally by our citizens.

ASSOCIATIONS OF EMPLOYERS.

The list of associations of employers in the Province which is presented below is slightly extended as compared with that of last year. One association was removed from the list as it was reported to be a private company, but four new associations were added.

Associations with purely trade or commercial or social objects are not included in this directory, which is confined to those organizations having direct concern with the employment of labour.

Box Manufacturers' Section, B.C. Division, Canadian Manufacturers' Association—Chairman, J. H. McDonald, B.C. Manufacturing Co., Ltd., New Westminster; Secretary, Hugh Dalton, 402 Pender Street West, Vancouver.

B.C. Jewellers' Association—President, O. B. Allan, Granville Street, Vancouver; Vice-President, G. E. Trorey, Granville Street, Vancouver; Secretary-Treasurer, A. Fraser-Reid, 1635 Napier Street, Vancouver. No definite date set for annual meeting and election of officers.

B.C. Loggers' Association—President, Goodwin G. Johnson, Capilano Timber Co., North Vancouver; Secretary, G. W. Muddiman, Metropolitan Building, Vancouver. Officers elected annually on January 15th.

B.C. Lumber & Shingle Manufacturers' Association—President, F. R. Pendleton, Straits Lumber Co., Red Gap; Secretary, R. H. H. Alexander, 915 Metropolitan Building, Vancouver. Officers elected annually on third Thursday in January.

B.C. Salmon Canners' Association—Secretary, W. D. Burdis, 804–5 London Building, Vancouver. Chairman elected at each meeting.

B.C. Tow Boat Owners' Association—President, E. J. Coyle, Coyle Towing Co., Ltd., 207 Hastings Street, Vancouver; Secretary, Capt. J. R. Stewart, 837 Hastings Street West, Vancouver; Vice-President, Capt. Geo. McGregor, Victoria Tug Co., Victoria. Election of officers in September each year.

B.C. Traffic & Credit Association—President, E. Doberer, Salmon Arm; Secretary-Manager, R. M. Winslow, Vernon.

Canadian Manufacturers' Association (B.C. Division); Provincial Headquarters, 701–3 Board of Trade Building, Vancouver—Chairman, F. E. Burke, Wallace Fisheries, Ltd.; Secretary, Hugh Dalton, Vancouver.

Canadian Manufacturers' Association (Victoria Branch), 402–3 Pemberton Building, Victoria—Chairman, E. Tomlin, B.C. Cement Co., 305 Belmont House, Victoria; Secretary, T. J. Goodlake, 402 Pemberton Building, Victoria.

Canadian Storage & Transfermen's Association—President, F. Crone, Independent Van & Storage Co., Vancouver; Secretary, E. A. Quigley, Suite 10, 423 Hamilton Street, Vancouver. This Association has Board of Directors for each Province.

Clay Products Section, B.C. Division, Canadian Manufacturers' Association—Chairman, James Parfitt, Victoria Brick Co., Victoria; Secretary, T. J. Goodlake, 402–3 Pemberton Building, Victoria.

Drug Extract & Vinegar Manufacturers' Section, Canadian Manufacturers' Association—Chairman, D. Hocken, National Drug and Chemical Co.; Vice-Chairman, W. A. Hunter, Empress Manufacturing Co.; Secretary, Hugh Dalton, 402 Pender Street West, Vancouver.

Employers' Association of B.C.—President, Innes Hopkins, B.C. Marine, Ltd., Vancouver; Manager, E. C. Mundy, 308 Credit Foncier Building, Vancouver.

Fishing Vessel Owners' Association, Inc.—President, Capt. Martin Johnson, Pier 8, Seattle, Wash.; Secretary, John Lokken, Pier 8, Seattle, Wash.

General Cartage & Storage Association of B.C.—President, D. Scott (Scott & Pease); Secretary, E. A. Quigley, Suite 10, 423 Hamilton Street, Vancouver.

General Contractors' & Master Builders' Association—President, F. T. King, London Building, Vancouver; Secretary, J. Hart, 309 Cordova Street West, Vancouver.

Manufacturers' Association of B.C.—Hon. President, J. H. Falconer, 1365 Powell Street, Vancouver; President, J. A. Cunningham, President B.C. Refining Co., Vancouver; Secretary, J. Hart, 309 Cordova Street West, Vancouver. Election of officers takes place annually within eight weeks of beginning of year.

Master Painters' & Decorators' Association—Secretary, H. J. Stroud, 1387 Howe Street, Vancouver. Officers elected in January each year.

Metal Trades' Employers' Association of B.C. (Vancouver Division)—President, D. A. McIntosh, 172 Alexander Street; Secretary, J. Hart, 744 Hastings Street West, Vancouver. Meets for election of officers in January or February each year.

Metal Trades' Section, Canadian Manufacturers' Association (B.C. Division)—President, Innes Hopkins, foot Victoria Drive, Vancouver; Secretary, J. Hart, 929 Granville Street, Vancouver. Election of officers in April each year.

Mining Association of British Columbia—President, W. R. Wilson, Fernie; Secretary, E. Mortimer Lamb, Pacific Building, Vancouver.

Mining Association of Eastern British Columbia —President, R. Randolph Bruce, Invermere; Secretary, W. H. Burgess, Kaslo. Annual meeting first Thursday in December.

Mountain Lumber Manufacturers' Association—President, A. K. Leitch, Jaffray; Secretary, I. R. Poole, Nelson. Officers elected at annual meeting held in January.

Northern B.C. Lumbermen's Association—President, E. F. Duby, Prince Rupert; Secretary, W. E. Williams, Prince Rupert.

Retail Merchants' Association of Canada, Inc., B.C. Board—President, J. T. Crowder, Vancouver; Vice-President, G. H. Jacobson, New Westminster; 2nd Vice-President, Harvey Murphy, Nanaimo; 3rd Vice-President, E. Gamlen, Victoria; Treasurer, D. H. Kent, Vancouver; Secretary, Geo. S. Hougham, 424 Pacific Building, Vancouver. Branches are established at Abbotsford, Agassiz, Armstrong, Chilliwack, Cloverdale, Courtenay, Cranbrook, Duncan, Grand Forks, Hammond and Haney, Kamloops, Kelowna, Ladner, Ladysmith, Lytton, Mission, Nanaimo, Nelson, New Westminster, North Vancouver, Merritt, Penticton, Princeton, Prince George, Port Alberni, Revelstoke, Trail, Vancouver, Vernon, Victoria, White Rock, Esquimalt, and Hope.

Sash & Door Employers' Association—Secretary, R. A. Ogilvie, 207 Hastings Street West, Vancouver.

Sheet Metal Employers' Association of B.C.—President, E. S Scouller.

Shingle Manufacturers' Association of B.C.—President, A. D. Anderson, 911 Metropolitan Building; Secretary, F. H. Lamar, 911 Metropolitan Building, Vancouver. Meets for election of officers in January each year.

Shipping Federation of B.C.—Manager and Secretary, Capt. J. R. Stewart, 837 Hastings Street West, Vancouver. Meets for election of officers in May each year.

Vancouver Association of Electrical Contractors and Dealers—President, C. C. Carter, 739 Hastings Street West; Secretary, P. F. Letts, 3044 Granville Street; office, 724 Pacific Building. Officers elected annually in September.

Vancouver Association of Sanitary & Heating Engineers—President, W. J. Heaslip, 446 Abbott Street, Vancouver; Secretary, Robert G. Hargreaves, 724 Pacific Building, Vancouver. Officers elected annually in June.

Vancouver Hotels' Association—President, J. A. Weldon, Grosvenor Hotel, Vancouver; Secretary, Ernest A. Masters, 333 Dunsmuir Street. Officers elected in January each year.

Vancouver Publishers' Association—President, J. H. Hamilton.

Timber Industries Council of B.C.—President, E. W. Hamber, B.C. Mills Timber and Trading Co.; Managing Director, M. A. Grainger, 617–8 Pacific Building, Vancouver.

Vancouver Typothetæ—President, John B. Cowan, 500 Beatty Street; Secretary and Manager, Wm. Brand, 624–5 Pacific Building, Vancouver. Officers elected annually on the last Wednesday in June.

Victoria Bread & Cake Manufacturers' Association—President, D. W. Hanbury, Golden West Bakery; Secretary, H. Amphlett, 206–7 Union Bank Building. Election of officers annually in January.

Victoria Builders' Exchange—President, Walter Luney, 508 Sayward Building; Secretary, J. W. Bolden, 1616 Cook Street. Officers elected annually in January.

Western Canada Coal Operators' Association—President, O. E. S. Whiteside, Coleman, Alta.; Secretary, R. M. Young, Calgary, Alta. Officers elected on second Friday in January each year.

UNION DIRECTORY.

It is believed that the following will prove a fairly complete directory of labour organizations in the Province. Every effort has been made to have the particulars brought up to date. A few of the unions enumerated in last year's directory have passed out of existence, but a larger number of additional ones have been reported; so that there is a slight increase in the number contained in the directory this year. Thanks are due to the numerous officials of trade unions and others who have willingly supplied us with the information given in the following pages.

TRADES AND LABOUR CONGRESS OF CANADA.

President, Thomas Moore, Ottawa. Vice-Presidents, H. J. Halford, Hamilton; A. Martel, Montreal; A. McAndrews, Moose Jaw, Sask. Secretary-Treasurer, P. M. Draper, Hope Building, Ottawa.

B.C. EXECUTIVE OF TRADES & LABOUR CONGRESS.

Chairman, F. W. Welsh, 1050 Pacific Street, Vancouver; Members, A. M. Davies, 1506 Holly Street, Victoria; W. J. Trotter, Box 12, Penticton; J. Wright, Smithers. Meets at call of Chairman.

NATIONAL ORGANIZATIONS.

Canadian Merchants' Service Guild.

Vancouver—President, Capt. F. H. Parker, c/o Union S.S Co., Vancouver; Secretary, A. Goodlad, 470 Granville Street, Vancouver. Meets in Rogers Building first Tuesday and first Thursday of each month.

Victoria—President and Secretary, T. H. Brown, 311 Union Bank Building.

National Association of Marine Engineers.

Vancouver Council No. 7—President, W. G. Wooster, Room 10, Jones Building, 407 Hastings Street West; Secretary, E. Read, Room 10, Jones Building, 407 Hastings Street West. Meets at 407 Hastings Street West at 8 p.m. on second and fourth Fridays in summer months and every Friday during winter months.

Victoria Council No. 6—President, W. Jordan, 410 Union Bank Building; Secretary, A. McNiven, 410 Union Bank Building.

TRADES AND LABOUR COUNCILS.

(International.)

Nelson—President, J. Lotman, Nelson; Secretary, Felix Pezeril, Box 624, Nelson.

New Westminster—President, H. Knudsen, 403 Royal Avenue; Secretary, R. Morgan, 313 Regina Street, New Westminster. Meets second and fourth Wednesdays in month at Labour Temple, New Westminster.

Prince Rupert—President, S. D. McDonald, Empire Office, Prince Rupert; Secretary, T. Ross Mackay, Box 1573, Prince Rupert. Meets at Carpenters' Hall on second and fourth Tuesdays of each month.

Revelstoke—President, James Mathie, Revelstoke; Secretary, Philip Parker, Box 234, Revelstoke. Meets at 8 p.m. at City Hall, Revelstoke, on the second and fourth Saturdays of each month.

Vancouver—President, H. Neelands, M.P.P., Vancouver; Secretary, P. R. Bengough, 319 Pender Street West, Vancouver. Meets first and third Tuesdays of each month at 319 Pender Street West at 8 p.m.

Victoria—President, S. J. Peele, 1241 Oxford Street; Secretary, E. Woodward, 1253 Carlin Street. Meets at 8 p.m. on first and third Wednesdays in month at Trades Hall, Broad Street.

Federated Trades Councils (Railroads).

Victoria (Esquimalt & Nanaimo Railway Employees' Federation)—President, Geo. Chilbrook, 811 King's Road, Victoria; Secretary, Charles Rose, 315 Wilson Street, Victoria.

METAL TRADES COUNCILS.

(International.)

Vancouver—President, A. J. Crawford, Vancouver; Secretary, P. R. Bengough, Vancouver. Meets at call of Chairman.

Victoria—President, Jas. Dakers; Secretary, W. A. Davies, 2517 Rock Bay Avenue. Meets every Friday at Labour Hall.

DISTRICT LODGES AND COUNCILS.

United Brotherhood of Carpenters and Joiners of America.

Victoria District Council—President, R. McLeod, 1609 Redfern Street; Secretary, J. Ley, Box 770. Meets second and fourth Tuesdays in month in Trades Hall.

International Association of Machinists.

Vancouver District Lodge No. 78—President, W. Clarke, 319 Pender Street West; Secretary, Evan Macmillan, 1820 Thirtieth Avenue West. Meets on first Sunday of each month at 319 Pender Street West, Vancouver, at 2.30 p.m.

District No. 2 (all Railroads in Canada)—President, R. J. Tallon, 580 Ontario Street, Toronto; Secretary, H. Kempster, 14 Labour Temple, Winnipeg.

Allied Printing Trades Council.

Vancouver—President, J. R. White, Box 66, Vancouver; Secretary, R. H. Neelands, Box 66, Vancouver. Meets at 319 Pender Street West, Vancouver, at 8 p.m. on second Monday in month.

Victoria—President, James Wilby, 180 Montreal Street; Secretary, W. H. Ozard, Box 206, Victoria. Meets at Trades Hall, Broad Street, at 8 p.m. on second Friday in month.

Theatrical Federation of Vancouver.

President—E. A. Jamieson, 310 London Building, Pender Street West; Secretary, G. W. Allin, 310 London Building, Pender Street West. Meets at 310 London Building at 10.30 a.m. on Tuesday before first Sunday in month.

Civic Federation.

Vancouver—President, C. Watson, No. 3 Fire Hall, Twelfth Avenue and Quebec Street, Vancouver; Secretary, H. Urquhart, Water Department, City Hall, Vancouver. Meets at call of Secretary.

TRADE UNIONS.

Ashcroft.

Maintenance-of-way Employees & Railway Shop Labourers, United Brotherhood of, Local No. 210—President, J. D. Nichol, Spatsum via Spences Bridge; Secretary, E. W. Kirby, Box 76, Lytton. Meets quarterly on third Saturday in January, April, July, and October at Ashcroft.

Chilliwack.

Maintenance-of-way Employees & Railway Shop Employees, United Brotherhood of, Local No. 31—President, E. Hall, Rosedale; Secretary, T. J. Blackadder, Box 134, Matsqui. Meets at 1.30 p.m. on first Sunday in March, June, September, and December at Vancouver.

Cranbrook.

Barbers' International Union, Journeymen, Local No. 632—President, W. J. Dodge, Cranbrook; Secretary, A. H. Bullock, Cranbrook. Meets at 8 p.m. on last Monday in month at A. H. Bullock's Barber Shop, Cranbrook.

Locomotive Firemen & Enginemen, Brotherhood of, Local No. 559—President, R. Bartholomew, Cranbrook; Secretary, M. H. Johns, Box 214, Cranbrook. Meets at 2.30 p.m. on first and third Sundays in month at Maple Hall, Cranbrook.

Locomotive Engineers, Brotherhood of, Local No. 563—President, Hugh J. Brook, Box 551, Cranbrook; Secretary, G. L. Ingram, P.O. Box 1, Cranbrook. Meets at 8 p.m. on second Monday in month at Maple Hall.

Maintenance-in-way Employees & Railway Shop Labourers, United Brotherhood of, Local No. 229—President, Geo. C. Brown, Box 739, Cranbrook; Secretary, C. A. Fransen, Kitchener. Meets at call of President.

Railway Conductors of America, Order of, Local No. 407—President, J. A. Geness, Cranbrook; Secretary, W. A. Wilson, Box 843, Cranbrook. Meets at K.P. Hall, Cranbrook, on second Sunday in month at 2.30 p.m.

Railway Carmen of America, Brotherhood of, Local No. 173—President, Wm. Hewson, Cranbrook; Secretary, J. F. Lunn, Cranbrook. Meets at 8 p.m. at Maple Hall on fourth Wednesday in month.

Railway Trainmen, Brotherhood of, Local No. 585—President, J. E. Pettigrew, Cranbrook; Secretary, P. C. Hartnell, Cranbrook. Meets at Maple Hall every Sunday at 7.30 p.m.

Corbin.

United Mine Workers of America, Local No. 2877—President, John Glover, Corbin; Secretary, J. R. MacDonald, Box 273, Corbin. Meets at Union Hall, Corbin, every second Sunday at 7.30 p.m.

Duncan.

Maintenance-of-way Employees & Railway Shop Labourers, United Brotherhood of, Local No. 533—President, W. H. Smith, Parksville Junction; Secretary, H. W. McKenzie, Duncan. Meets at Duncan at call of President.

Fernie.

Brewers' Union—President, P. Robinson, Fernie; Secretary, O. N. Woods, Fernie. Meets at Fernie at 7 p.m. on first Monday of month.

Brewery, Flour, Cereal & Soft Drink Workers of America, International Union of, Local No. 308—President, Richard Banks, Box 1071, Fernie; Secretary, John van Masrion, Box 1071, Fernie. Meets at Fernie on second Friday of each month at 8 p.m.

Teamsters, Chauffeurs, Stablemen & Helpers, International Brotherhood of, Local No. 141—President, J. T. Webb, Fernie; Secretary, F. James, Fernie. Meets at Ingram's Hall, Fernie, on third Friday of each month at 8 p.m.

United Mine Workers of America, Local No. 2314—President, Wm. Hunter, Fernie; Secretary, T. Whitehouse, Fernie. Meets at South Room, Miners' Theatre, on second and third Sundays of each month at 7.30 p.m.

Golden.

Maintenance-of-way Employees & Railway Shop Labourers, United Brotherhood of, Local No. 165—President, H. Swanson, Golden; Secretary, C. Godfreyson, Box 57, Golden. Meets at Golden on the last Sunday of each quarter at 10 a.m.

Greenwood.

Mine, Mill & Smelter Workers, International Union of, Local No. 22—Secretary, W. Lakeland, Greenwood.

Kamloops.

Locomotive Engineers, Brotherhood of, Division No. 821—President, F. W. McKenrot, 4 Fourth Avenue, Kamloops; Secretary, T. J. O'Neill, Box 753, Kamloops. Meets at Orange Hall on first and third Thursdays in month at 2.30 p.m.

Locomotive Engineers, Brotherhood of, Division No. 855—President, L. L. Ross, Kamloops; Secretary, M. R. Lewis, Box 95, Kamloops. Meets first and third Sundays.

Locomotive Firemen & Enginemen, Brotherhood of, Local No. 258—President, Howard Embley, Kamloops; Financial Secretary, A. Haig; Recording Secretary, Frank Vereker, Kamloops.

Railway Carmen, Brotherhood of, Local No. 148—President, O. E. Klemmer, Kamloops; Secretary, H. T. Batchelor, Box 221, Kamloops. Meets at Kamloops on fourth Thursday in month at 8 p.m.

Railway Conductors of America, Order of, Division No. 611—Chief Conductor, P. F. McLellan, Kamloops; Secretary, W. Bailey, 420 Seymour Street, Kamloops. Meets at Orange Hall, Kamloops, on second and fourth Tuesdays in month at 2 p.m.

Railway Trainmen, Brotherhood of, Local No. 519—President, G. F. Jenkinson, Kamloops; Secretary, V. Mott, Kamloops. Meets at 113 Main Street on first and third Sundays in month at 2.30 p.m.

Lucerne.

Maintenance-of-way Employees & Railway Shop Labourers, United Brotherhood of, Local No. 15—President, Ed. Murphy, Hilton, Alta.; Secretary, T. Tostenson, Boulder via Kamloops. Meets first Sunday in January, April, July, and October.

Mission City.

Maintenance-of-way Employees & Railway Shop Labourers, United Brotherhood of, Local No. 168—President, J. Cole, Spuzzum; Secretary, Geo. G. Westwood, Box 86, Mission City. Meets third Sunday in month at 2.30 p.m.

Michel.

United Mine Workers of America, Local No. 2334—President, A. Causey, Natal; Secretary, F. Irvine, Box 42, Michel. Meets in Natal Club Hall, Natal, at 2.30 p.m. on Sundays.

Nanaimo.

Postal Workers, Amalgamated—President, E. B. Booth, Fitzwilliam Street, Nanaimo; Secretary, G. W. Green, 20 Strickland Street, Nanaimo. Meets at No. 2 Front Street when convenient for members.

Typographical Union, International, Local No. 337—President, James J. Begg, c/o Free Press Block, Nanaimo; Secretary, L. C. Gilbert, Box 476, Nanaimo. Meets at call of President.

Nelson.

Barbers' International Union, Journeymen, Local No. 196—President, Eli Sutcliffe, Nelson; Secretary, Harry McCreath, Nelson. Meets in Nelson at 8 p.m. on third Thursday in month.

Brewery, Flour, Cereal & Soft Drink Workers of America, Local No. 28—Secretary, W. J. Brodie, Nelson.

Building Trades Association of Nelson—President, J. Notman, Nelson; Secretary-Treasurer, G. H. Fraser, Box 254, Nelson. Meets at Labour Temple on first and third Wednesdays in month at 8 p.m.

Locomotive Engineers, Brotherhood of, Division No. 579—President, J. Simons, Box 771, Nelson; Secretary, P. C. Lindsay, Box 805, Nelson. Meets at K. of P. Hall, Nelson, on first and third Sundays in the month at 2.30 p.m.

Locomotive Firemen & Enginemen, Brotherhood of, Division No. 631—President, G. Turner, Box 323, Nelson; Secretary, Stanley Smith, Box 1084, Nelson. Meets second and fourth Sundays at 2 p.m. in K. of P. Hall.

Machinists, International Association of, Local No. 663—President-Secretary, Fred. Chapman, Box 253, Nelson.

Maintenance-of-way Employees & Railway Shop Labourers, United Brotherhood of, Local No. 181—President, H. Erickson, Nelson; Secretary, F. Gustafson, Box 265, Nelson. Meets last Sunday in month.

Mine, Mill & Smelter Workers, International Union of, Local No. 95—Secretary, Marcus Martin, Nelson.

Railway Carmen of America, Brotherhood of, Local No. 98—President, W. Bartholomew, Box 1187, Nelson; Secretary, Felix Pezeril, Box 624, Nelson. Meets in Labour Temple at 8 p.m. on second and fourth Thursdays in month.

Railway Conductors of America, Order of, Division No. 460—Chief Conductor, A. B. Hall, 915 Stanley Street, Nelson; Secretary, H. L. Genest, Box 216, Nelson. Meets in K. of P. Hall at 2.30 p.m. on second Sunday in month.

Railway Trainmen, Brotherhood of, Local No. 558—President, W. S. Jackson, 213 Selina Street, Nelson; Secretary, A. Kirby, 820 Carbonate Street, Nelson. Meets at 11 a.m. on second and fourth Sundays in month.

Typographical Union, International, Local No. 340—President, D. C. McMorris, Nelson; Secretary, H. W. Whimster, Box 532, Nelson. Meets in Daily News Office, Nelson, at 5.15 p.m. on last Wednesday in month.

New Westminster.

Barbers' International Union, Journeymen, Local No. 573—President, A. W. Cross, Begbie Street, New Westminster; Secretary, George Yorkstown, 35 Eighth Street, New Westminster. Meets at 35 Eighth Street on fourth Tuesday in month at 7.30 p.m.

Blacksmiths, Drop Forgers & Helpers, International Brotherhood of, Local No. 392—President, G. Bolton, 515 Sixteenth Avenue, New Westminster; Secretary, Lewis Earle, 910 Fifth Avenue, New Westminster. Meets first and third Mondays at Labour Hall.

Brewery, Flour, Cereal & Soft Drink Workers of America, International Union of, Local No. 286—President, R. H. Reubens, Sapperton; Secretary, W. K. Bent, Second and Fourth Avenues, New Westminster. Meets in Labour Temple on second Tuesday in month at 8 p.m.

Carpenters & Joiners of America, United Brotherhood of, Local No. 1251—President, Ralph Wilson, 501 Sixth Avenue, New Westminster; Secretary, F. H. Shaw, 1038 Eighteenth Avenue, New Westminster. Meets at Labour Temple on first Tuesday in month at 7.30 p.m.

Cigar Makers of America, International Union of, Local No. 486—Secretary, A. C. Miller, 315 Sixth Avenue, New Westminster. Meets at Labour Temple on the first Wednesday in the month at 8 p.m.

Civic Employees of New Westminster, Union of—President, Richard Reid, 527 Ninth Street, New Westminster; Secretary, Rees Morgan, 313 Regina Street, New Westminster. Meets in Labour Temple at 8 p.m. on first Tuesday in month.

Machinists, International Association of, Local No. 151—President, Peter Wilkie, New Westminster; Secretary, E. C. Tinner, 3378 Parker Street, Vancouver.

Maintenance-of-way Employees & Railway Shop Labourers, United Brotherhood of, Local No. 1734—President-Secretary, Fred. C. Shaw, General Delivery, New Westminster.

Musicians, American Federation of (Musicians' Mutual Protective Association), Local No. 654—President, J. W. Rushton, 1020 Dublin Street, New Westminster; Secretary, F. Staton, 225 Sixth Street, New Westminster. Meets in Labour Temple at 2.30 p.m. on fourth Sunday in month.

Postal Workers, Amalgamated—President, C. S. Huff, 122 Sixth Avenue, New Westminster; Secretary, A. L. Bowden, 626 Sixth Avenue, New Westminster. Meets in Labour Temple at 8 p.m. on first Wednesday in month.

Railway Carmen of America, Brotherhood of, Local No. 280—President, W. T. Aitchison, Central Park P.O., South Vancouver; Secretary, A. H. Muttitt, 212 Fifth Avenue, New Westminster. Meets at Labour Temple on fourth Tuesday in month at 8 p.m.

Retail Clerks International Protective Association, Local No. 1306—President, W. W. Callender, 321 Pine Street, New Westminster; Secretary, J. Ellis, 310 Third Street, New Westminster. Meets in Hart Block at 8 p.m. on last Thursday in month.

Street & Electric Railway Employees of America, Amalgamated Association of, Division No. 134—President, R. C. Higgins, Hamilton Street, New Westminster; Secretary, A. J. Bond, 519 Fourteenth Street, New Westminster. Meets in Labour Temple at 8 p.m. on second and fourth Tuesdays in month.

Typographical Union, International, Local No. 632—President, J. T. Burnett, Box 1024, New Westminster; Secretary, R. A. Stoney, Box 1024, New Westminster. Meets in Labour Temple at 5 p.m. on last Friday in month.

Penticton.

Maintenance-of way Employees & Railway Shop Labourers, United Brotherhood of, Local No. 1023—President, James Slater, General Delivery, Penticton; Secretary, Geo. Bongalis, Box 233, Penticton. Meets in Penticton at 1 p.m. on second Sunday of every second month.

Locomotive Firemen & Enginemen, Brotherhood of, Local No. 884—President, C. A. Tupper, Penticton; Secretary, A. H. Parkins, Penticton.

Railroad Trainmen, Brotherhood of, Local No. 914—President, A. Campbell; Secretary, R. S. Fraser, B.C. Hotel, Penticton.

Powell River.

Paper Makers, International Brotherhood of, Local No. 142—President, Gustave Schuler, Powell River; Secretary, E. L. Dellar, Box 153, Powell River. Meets in Central Hall at 7 p.m. on second Sunday of each month.

Pulp, Sulphite & Paper Mill Workers of United States and Canada, International Brotherhood of, Local No. 76—President, George P. O'Malley, Powell River; Secretary, J. A. Goddard, Powell River. Meets first and third Sundays of each month at Central Hall.

Prince George.

Locomotive Engineers, Brotherhood of, Division No. 843—President, George Abbott, Prince George; Secretary, A. McMillan, Prince George. Meets in Odd Fellows' Hall on second and fourth Mondays of each month.

Locomotive Firemen & Enginemen, Brotherhood of, Local No. 827—President, G. W. Taylor, Box 246, Prince George; Secretary, F. Armstrong, Box 189, Prince George. Meets in I.O.O.F. Hall at 2.30 p.m. on first and third Sundays in the month.

Maintenance-of-way Employees & Railway Shop Labourers, United Brotherhood of, Local No. 202—Secretary, W. Sim, Giscome. Meets in I.O.O.F. Hall, Prince George, at call of the President.

Railway Conductors of America, Order of, Local No. 620—President, Bert Gogna, Prince George; Secretary, J. E. Paschall, Box 48, Prince George. Meets in Odd Fellows' Hall on first Sunday and third Monday in month at 8 p.m.

Railroad Employees, Local No. 28—President, George Foster, Prince George; Secretary, R. A. Ellis, Prince George. Meets in Odd Fellows' Hall at call of President.

Prince Rupert.

Carpenters & Joiners of America, United Brotherhood of, Local No. 1735—President, J. J. Gillis, Prince Rupert; Recording Secretary, Rod McLeod, Box 839, Prince Rupert; Financial Secretary, W. H. Shoebridge, Prince Rupert. Meets in Carpenters' Hall at 8 p.m. on first and third Wednesdays of each month.

Civic Employees' Association—President, G. B. Casey (fireman); Secretary, Miss C. Orchard, Box 474, Prince Rupert.

Deep Sea Fishermen's Union of the Pacific—Secretary-Treasurer, P. B. Gill, Box 65, Seattle; Agent, J. H. Meager, Box 1675, Prince Rupert. Meets in Exchange Block on Tuesday of each week.

Electrical Workers, International Brotherhood of, Local No. 344—President, J. J. Little, Box 125, Prince Rupert; Secretary, S. Massey, Box 457, Prince Rupert. Meets in Carpenters' Hall at 8 p.m. on second Friday of each month.

Longshoremen's Association, International, Local No. 38-41—President, W. A. Pilford, Moresby Avenue, Prince Rupert; Secretary, T. Rosey, Eleventh Street, Prince Rupert. Meets at Prince Rupert on Monday of each week at 8 p.m.

Machinists, International Association of, Local No. 207—President, J. McLean, Prince Rupert; Secretary, C. W. Poole, Box 54, Prince Rupert. Meets in Carpenters' Hall at 8 p.m. on second and fourth Wednesdays in month.

Maintenance-of-way Employees & Railway Shop Labourers, United Brotherhood of, Local No. 335—President, T. G. McManamon, Kwinitsa; Secretary, H. H. Schultz, Salvus, Skeena River. Meets in Prince Rupert at call of President.

Painters, Decorators & Paperhangers of America, Brotherhood of, Local No. 731—President J. A. Curtis, 331 Second Avenue, Prince Rupert; Secretary, W. Bissett, Empress Hotel, Prince Rupert. Meets at 331 Second Avenue at 8 p.m. on first and third Tuesdays of each month.

Plumbers and Steamfitters of the United States and Canada, United Association of, Local No. 495—President, Ernest Green, Prince Rupert; Secretary, C. D. Brown, Box 209, Prince Rupert. Meets in Carpenters' Hall at 8 p.m. on first and third Mondays in the month.

Railway Carmen of America, Brotherhood of, Local No. 426—President, H. Leaper, Box 465, Prince Rupert; Secretary, Frank Derry, Box 498, Prince Rupert. Meets in Carpenters' Hall, Prince Rupert, at 8 p.m. on second Monday of each month.

Railway Employees, Brotherhood of, Division No. 154—President, R. E. James; Secretary, John Ross, Prince Rupert. Meets at Carpenters' Hall, Fraser Street, at 8 p.m. on the fourth Monday of each month.

Railway Trainmen, Brotherhood of, Local No. 869—President, A. Greenhalgh, Box 12, Prince Rupert; Secretary, H. H. Oleson, Box 12, Prince Rupert. Meets in Prince Rupert at 8.30 p.m. on first and third Thursdays of each month.

Sheet Metal Workers, International Alliance, Local No. 672—President, G. Dobbs; Secretary, W. M. Sutherland, Box 90, Prince Rupert. Meets in Carpenters' Hall at 8 p.m. on fourth Friday in the month.

Steam & Operating Engineers, Local No. 510—President, R. C. Parsons, Prince Rupert; Secretary, Sydney W. Smith, Prince Rupert. Meets in Carpenters' Hall at 8 p.m. on first Friday of each month.

Typographical Union, International, Local No. 413—President, S. D. MacDonald, Box 689, Prince Rupert; Secretary, J. M. Campbell, Box 689, Prince Rupert. Meets in Carpenters' Hall at 8 p.m. on last Thursday of each month.

Revelstoke.

Blacksmiths, Drop Forgers and Helpers, International Brotherhood of, Local No. 407—President, Jas. Mathie, Revelstoke; Secretary, Jas. M. Goble, Box 283, Revelstoke. Meets in Selkirk Hall on the fourth Saturday of each month at 8 p.m.

Boilermakers, Iron Shipbuilders & Helpers of America, International Brotherhood of, Local No. 466—President, Thomas McMillan, Revelstoke; Secretary, Allen McMahon, Box 407, Revelstoke. Meets in Revelstoke at 5 p.m. on third Sunday of each month.

Locomotive Engineers, Brotherhood of, Division 657—President, S. Stingley, Box 284, Revelstoke; Secretary, J. P. Purvis, Box 27, Revelstoke. Meets in Selkirk Hall at notice of Secretary on first and third Wednesdays of each month.

Locomotive Firemen & Enginemen, Brotherhood of, Local No. 341—President, R. McKay, Revelstoke; Secretary, S. F. Deptford, Revelstoke. Meets in Selkirk Hall, Revelstoke, on the second Wednesday of each month.

Machinists, International Association of, Local No. 258—President, A. W. Bell, Revelstoke; Secretary, Dugald Bell, Box 234, Revelstoke. Meets in Smyth's Hall at 8 p.m. on Mondays.

Maintenance-of-way Employees & Railway Shop Labourers, United Brotherhood of, Local No. 208—President, A. L. Anderson, Revelstoke; Secretary, A. Blackberg, Revelstoke. Meets in Revelstoke at 8 p.m. on first Saturday in February, May, August, and November.

Railway Carmen of America, Brotherhood of, Local No. 481—President, O. Norberg, Revelstoke; Secretary, H. Parsons, Revelstoke. Meets in Smyth's Hall at 8 p.m. on third Tuesday of each month.

Railway Conductors of America, Order of, Mount Stephen Division, Local No. 487—President, John Knox, Revelstoke; Secretary, R. M. McDonald, Box 25, Revelstoke. Meets in Selkirk Hall at 7.30 p.m. on second Monday and 2.30 p.m. on fourth Sunday of each month.

Railway Trainmen, Brotherhood of, Local No. 51—President, R. J. Esselmont, Revelstoke; Secretary, W. Maxwell, Box 44, Revelstoke. Meets in Selkirk Hall at 2.30 p.m. on first Sunday and at 8 p.m. on third Monday of each month.

Rosebery.

Maintenance-of-way Employees & Railway Shop Labourers, United Brotherhood of, Local No. 173 — President-Secretary, Warren Nelson, Rosebery.

Salmon Arm.

Maintenance-of-way Employees & Railway Shop Labourers, United Brotherhood of, Local No. 193—President, W. E. Boyde, Pritchard; Secretary, Chas. G. Anderson, Box 49, Notch Hill. Meets at Finn Hall, Salmon Arm, at the call of the Chair.

Slocan Lake.

Mine, Mill & Smelter Workers, International Union of, Local No. 98—President, J. H. Strickland; Secretary, A. Shilland, Sandon.

Smithers.

Locomotive Firemen & Enginemen, Brotherhood of, Local No. 111—President, J. R. McIntyre, Smithers; Secretary, F. V. Foster, Smithers. Meets at Smithers on first and third Tuesdays in month at 8 p.m.

Maintenance-of-way Employees & Railway Shop Labourers, United Brotherhood of, Local No. 340—President, H. Johnson, Burns Lake; Secretary, D. Matheson, Barnett Lake. Meets at Smithers every three months.

Stewart.

Mine, Mill & Smelter Workers' Union, International, Local No. 181—Secretary, W. Fraser, Stewart.

Trail.

Machinists, International Association of, Local No. 763—President, H. A. Johnston, Trail; Secretary, Alex. Balfour, Box 114, Trail. Meets in Miners' Hall at 7.30 p.m. on second and fourth Tuesdays of each month.

Musicians, American Federation of (Musicians' Mutual Protective Association), Local No. 713—President, Claude H. Wright; Secretary, C. W. Openshaw, Trail.

Vancouver.

Bakery Salesmen's International Union of America, Local No. 371—President, J. Brightwell; Secretary, H. A. Bowron, 2849 Burns Street. Meets at 319 Pender Street West on second Thursday of each month at 8 p.m.

Barbers' International Union, Journeymen, Local No. 120—President, C. E. Herrett, 2124 Fourth Avenue East; Secretary, A. R. Jennie, 320 Cambie Street. Meets at Room 313, 319 Pender Street West, at 7.15 p.m. on second and fourth Tuesdays in month.

Blacksmiths, Drop Forgers and Helpers, International Brotherhood of, Local No. 151—President, W. J. Bartlett, 1193 Burrard Street; Secretary, A. Arman, 2048 Second Avenue West, Vancouver. Meets at 319 Pender Street at 8 p.m. on third Tuesday of each month.

Boilermakers, Iron Shipbuilders & Helpers, International Brotherhood of, Local No. 194—President, P. Wilkies, 260 Dufferin Street East, Vancouver; Secretary, A. Fraser, Room 303, 319 Pender Street West. Meets at Room 303, 319 Pender Street West, at 8 p.m. on first and third Mondays of each month.

Bookbinders, International Brotherhood of, Local No. 105—President, George Mowat, Box 411, Vancouver; Secretary, Francis J. Milne, Box 411, Vancouver. Meets at 319 Pender Street West, Vancouver, on third Wednesday of each month at 8 p.m.

Boot & Shoe Workers' Union, Local No. 505—President, F. W. Digby, 1958 Forty-first Avenue East, Vancouver; Secretary, Tom Cory, 445 Vernon Drive, Vancouver. Meets at 319 Pender Street West at 8 p.m. on first Wednesday in month.

Brewery, Flour, Cereal & Soft Drink Workers of America, International Union of, Local No. 281—Secretary, W. H. McLean, 2095 Broadway West, Vancouver.

Bricklayers, Masons & Plasterers' International Union of America, Local Union No. 1, B.C.—President, H. Cupit, 1606 McLean Drive, Vancouver; Secretary, Wm. L. Padgett, 2066 Eighth Avenue West, Vancouver. Meets at 319 Pender Street, Vancouver, on second and fourth Wednesdays in month at 8 p.m.

Bridge and Structural Iron Workers, International Association of, Local No. 97—President, D. B. Harrington, 181 Lorne Avenue East, Suite 19, Vancouver; Secretary, B. Bronson, 2147 Howard Street, Vancouver. Meets at Room 310, 319 Pender Street West, Vancouver, at 8 p.m. on second and fourth Mondays of each month.

Carpenters and Joiners, Amalgamated Society of, Branch No. 1—President, W. Taylor, 3030 Miller Avenue, McKay P.O.; Secretary, C. E. Ellis, 1657 Thirty-sixth Avenue East, South Vancouver. Meets at 148 Cordova Street West on second and fourth Tuesdays of each month.

Carpenters and Joiners, Amalgamated Society of, Branch No. 2—President, A. Arnold, Third Street, North Vancouver; Secretary, W. Bray, 72 Sixteenth Avenue West, Vancouver. Meets at 148 Cordova Street West on first and third Tuesdays of month at 8 p.m.

Carpenters and Joiners, United Brotherhood of, Local No. 452—President, W. Dunn; Secretary, W. J. Johnston, 73 Twenty-fourth Avenue West, South Vancouver. Meets at 319 Pender Street West, Vancouver, at 8 p.m. on second and fourth Mondays in month.

Cigarmakers, International Union of America, Local No. 357—President, G. Thomas, 1199 Bidwell Street, Vancouver; Secretary, F. Brown, 319 Pender Street West, Vancouver. Meets at 319 Pender Street West, Vancouver, at 8 p.m. on first Tuesday in month.

City Hall Employees' Association, Local No. 59 (Chartered by Trades & Labour Congress of Canada)—President, R. W. Armstrong, City Hall, Vancouver; Secretary, E. Robson, City Solicitor's Office, Vancouver. Meets at Roaf Building, corner Pender and Richards Streets, Vancouver, at 8 p.m. on first Wednesday of each month.

Civic Employees' Federal, Local No. 28 (Chartered by Trades & Labour Congress of Canada)—President, J. White, 3344 Inverness Street, Vancouver; Secretary, G. Harrison, 1335 Woodland Drive, Vancouver. Meets at 148 Cordova Street West, Vancouver, on first and third Fridays in month at 8 p.m.

Civil Servants of Canada, Amalgamated—President, H. E. Warburton, Box 322, Vancouver; Secretary, M. W. Buck, Box 322, Vancouver.

Commercial Telegraphers' Union of America, Vancouver Division, No. 63—Chairman, W. D. Brine, 154 Twenty-fourth Avenue West, Vancouver.

Dominion Express Employees, Brotherhood of, Local No. 15—President, J. C. Chalmers, 1646 Fourth Avenue East, Vancouver; Secretary, W. Bradley, 1859 Thirtieth Avenue East, Vancouver.

Electrical Workers, International Brotherhood of, Local No. 77A—Secretary, F. Foxcroft, 319 Pender Street West, Vancouver.

Electrical Workers, International Brotherhood of, Local No. 213—President, H. Northrop; Secretary, D. W. McDougall, 148 Cordova Street West; Financial Secretary and Business Agent, E. H. Morrison, 148 Cordova Street West, Vancouver. Meets at 148 Cordova Street West on Mondays at 8 p.m.

Electrical Workers, International Brotherhood of, Local No. 310—Secretary, J. E. Davis, 1016 Sixteenth Avenue, New Westminster; Financial Secretary, W. E. Buntin, 1746 Barclay Street, Vancouver. Meets at 319 Pender Street West, Vancouver, at 8 p.m. every Monday.

Fire Fighters, International Association of, Local No. 18—President, Percy Trerise, No. 2 Fire Hall, 754 Seymour Street, Vancouver; Secretary, Chas. A. Watson, No. 3 Fire Hall, Twelfth and Quebec Streets, Vancouver. Meets at Trades & Labour Council, 319 Pender Street West.

Garment Workers of America, United, Local No. 160—President, Mrs. W. Mahon, 504 Hastings Street East, Vancouver; Secretary, Miss May Ward, 447 Hornby Street, Vancouver. Meets at 319 Pender Street West at 6 p.m. on first Thursday in month.

Granite Cutters, International Association of—President, G. Fordyce, 533 Fifty-third Street East, Vancouver; Secretary, John Philip, 2537 Trinity Street. Meets on third Friday of month at 319 Pender Street West at 8 p.m.

Hotel & Restaurant Employees, International Alliance, Local No. 28—President, W. Colmar, 441 Seymour Street, Vancouver; Secretary, A. Graham, 441 Seymour Street, Vancouver. Meets at 441 Seymour Street at 8.30 p.m. each Wednesday.

Japanese Workers' Union of Canada—President, S. A. Kamino, 606 Powell Street, Vancouver; Secretary, K. S. Gasnura, 353 Cordova Street, Vancouver.

Jewellery Workers, International Union of, Local No. 42—President, J. E. Dawson, 1645 Yew Street, Vancouver; Secretary, H. Purdy, 728 Seventh Avenue East, Vancouver. Meets on second and fourth Mondays in month.

Lathers, Wood, Wire & Metal, International Union, Local No. 207—President, A. B. Finly, 527 Thirty-fourth Avenue East, Vancouver; Secretary, A. P. Surges, 829 Fifty-second Avenue East, Vancouver. Meets at 315 Holden Building, Vancouver, at 8 p.m. on first and third Fridays in month.

Lithographers of America, Amalgamated, Local No. 44—President, H. J. Rhodes; Secretary, H. S. Walker, 1008 Pendrell Street, Vancouver. Meets at Room 302, 319 Pender Street West, Vancouver, at 8 p.m. on third Wednesday in month.

Locomotive Engineers, Brotherhood of, Division No. 320—President, G. P. Boston, 1741 Third Avenue West, Vancouver; Secretary, H. O. B. McDonald, 1222 Pendrell Street, Vancouver. Meets at I.O.O.F. Hall on second and fourth Tuesdays in month at 8 p.m.

Locomotive Firemen and Enginemen, Local No. 656—President, T. McEwen, 1235 Hornby Street, Vancouver; Secretary, S. H. Waterhouse, 1425 Sixth Avenue West, Vancouver. Meets at I.O.O.F. Hall on first and third Tuesdays of each month.

Longshoremen's Association, International, Local No. 38-52—Secretary, T. Nixon, 152 Cordova Street East, Vancouver; Business Agent, E. Cook, 152 Cordova Street East, Vancouver. Meets at 152 Cordova Street East, Vancouver, at 8 p.m. on first and third Fridays in month.

Longshoremen's Association, Auxiliary Local (Waterfront Freight Handlers)—President, D. Poulter, 1054 Pender Street West, Vancouver; Secretary, S. G. Osborne, 808 Powell Street, Vancouver. Meets at 808 Powell Street, Vancouver, on first and third Wednesdays in month at 8 p.m.

Machinists, International Association of, Local No. 182—President, L. B. George, 538 Georgia Street West, Vancouver; Secretary, B. S. Oliver, 1899 Ogden Avenue, Vancouver. Meets at 319 Pender Street West, Vancouver, at 8 p.m. on first and third Thursdays.

Machinists, International Association of, Local No. 692—President, E. Dawson, Box 2002, Vancouver; Secretary, P. R. Bengough, Room 309, 319 Pender Street West, Vancouver. Meets at 319 Pender Street West, Vancouver, at 8 p.m. on second and fourth Tuesdays.

Maintenance-of-way Employees & Railway Shop Labourers, United Brotherhood of, Local No. 167—President, G. S. Johnstone, 1828 Sixth Avenue West, Vancouver; Secretary, A. D. McDonald, 991 Pender Street West, Vancouver. Meets at 319 Pender Street West, Vancouver, at 8 p.m. on third Thursday in month.

Maintenance-of-way Employees & Railway Shop Labourers, United Brotherhood of, Local No. 1734—President, A. Shunn, 5829 Lancaster Street, South Vancouver; Secretary, T. A. Wood, 1417 Eighth Avenue East, Vancouver.

Marine Firemen & Oilers' Union of B.C.—President, Dan Canlin, 108 Main Street, Vancouver; Secretary, W. Donaldson, 108 Main Street, Vancouver. Meets at 108 Main Street at 7 p.m. on first and third Wednesdays in month.

Milk Drivers and Dairy Employees, Local No. 464—President, C. Yates, 319 Pender Street West, Vancouver; Secretary, B. Showler, 1115 Robson Street, Vancouver. Meets at 319 Pender Street West at 8 p.m. on second and fourth Fridays in month.

Moulders of North America, International Union of, Local No. 281—President, A. Hubert; Secretary, George Arnaud, 1255 Albert Street, Vancouver. Meets at Room 3, 319 Pender Street West, Vancouver, at 8 p.m. on first and third Fridays in month.

Moving Picture Machine Operators, Local No. 348—President, F. Tinney, 310 London Building; Secretary, W. Gerrard, 310 London Building, Vancouver. Meets on first Sunday in month at 310 London Building at 7.30 p.m.

Musicians, American Federation of (Musicians' Mutual Protective Association), Local No. 145—President, J. W. Rushton, 1020 Dublin Street; Secretary, Edward A. Jamieson, 308 London Building, Vancouver. Meets at Labour Temple, Vancouver, at 2.30 p.m. on fourth Sunday in month.

Painters, Decorators & Paperhangers of America, Local No. 138—President, W. Hunt, 2063 Fourth Avenue West, Vancouver; Secretary, J. McMillan, Suite 2, 2200 Heather Street, Vancouver. Meets at Labour Party Hall, 148 Cordova Street, Vancouver, at 8 p.m. on second and fourth Thursdays in month.

Pile Drivers, Bridge, Wharf & Dock Builders, Local No. 2404, United Brotherhood of Carpenters & Joiners—President, W. H. Pollard, Box 320, Vancouver; Secretary, M. H. Vernon, Box 320, Vancouver. Meets at 319 Pender Street West, Vancouver, at 8 p.m. on second and fourth Fridays of month.

Photo Engravers' International Union of North America, Local No. 54—President, F. Looney, 530 Burrard Street, Vancouver; Secretary, Gordon Edwards, 2723 Fifth Avenue West, Vancouver. Meets at 530 Burrard Street, Vancouver, at 8 p.m. on Saturday of each week.

Plasterers and Cement Finishers, International Association of the United States and Canada, Local No. 89—President, W. R. Strickland, 289 Forty-sixth Avenue East, South Vancouver; Secretary, Alfred Hurry, 861 Thirty-fourth Avenue East, South Vancouver. Meets at Rigg-Selman Block, 319 Pender Street West, Vancouver, at 8 p.m. on first Wednesday in month.

Plumbers and Steam Fitters of the United States and Canada, United Association of, Local No. 170—President, B. Stinchcombe, Vancouver; Secretary, J. Crowther, Vancouver; Business Agent, S. G. Smylie, Box 1131, Vancouver. Meets at 319 Pender Street West, Vancouver, at 8 p.m. on second and fourth Fridays.

Policemen's Federation (Chartered by Trades & Labour Congress of Canada), Local No. 12—President, D. Mitchell, 3142 Twentieth Avenue East, Vancouver; Secretary, C. W. Spence, 2675 Pandora Street, Vancouver. Meets at 440 Pender Street West, Vancouver, at 7.30 p.m. on last Tuesday of month.

Postal Workers, Amalgamated—President, D. J. McCarthy, 2325 Maple Street, Vancouver; Secretary, J. Linsen, c/o Dispatch Branch, Vancouver. Meets at 535 Homer Street at 7.30 p.m. on second Friday of month.

Printing Pressmen & Assistants, International Union of North America, Local No. 69—President, H. F. Longley, North Shore Press, North Vancouver; Secretary, A. S. Blaney, Box 894, Vancouver. Meets at 112 Hastings Street, Vancouver, at 8 p.m. on second Tuesday in month.

Railroad Employees, Canadian Brotherhood of, Division No. 59—President, F. Springhorn, C.N.R. Freight Office, Vancouver; Secretary, Charles Bird, 2030 Union Street, Vancouver. Meets at I.O.O.F. Hall, 515 Hamilton Street, at 8 p.m. on first Monday in month.

Railway Carmen of America, Brotherhood of, Local No. 58—President, T. Sommerville, 2121 Princess Street, South Vancouver; Secretary, J. Vulliamy, 2215 Fifteenth Avenue West, Vancouver. Meets at Cotillion Hall, Davie and Granville Streets, on first and third Fridays in month at 8 p.m.

Railway Conductors of America, Order of, Division No. 267—President, J. R. Burton, 1324 First Avenue East, Vancouver; Secretary, J. B. Physick, 1156 Thurlow Street, Vancouver. Meets at I.O.O.F. Hall on first Sunday at 2 p.m. and on third Thursday at 8 p.m.

Railway Mail Clerks' Federation (Dominion)—President, C. Booth, Railway Mail Clerk, Vancouver; Secretary, C. S. Bate, 2172 Seventh Avenue West, Vancouver.

Railway & Steamship Clerks, Freight Handlers, Express & Station Employees, Brotherhood of, No. 630—President, J. Brodie, 67 East Lorne Street, Vancouver; Secretary, G. H. Morritt, 1833 Thirteenth Avenue East, Vancouver.

Railway & Steamship Clerks, Freight Handlers, Express & Station Employees, Brotherhood of, Local No. 46—President, G. S. Hodgson, 5615 Commercial Street, South Vancouver; Secretary, H. Glover, 390 Sixteenth Avenue East, Vancouver.

Railway & Steamship Clerks, Freight Handlers, Express & Station Employees, Brotherhood of, Local No. 1236—President, H. P. Wilson, 1758 Thirty-third Avenue East, Vancouver; Secretary, T. Livingstone, 926 King Edward Avenue West, Vancouver.

Railway Trainmen, Brotherhood of, Local No. 144—President, G. H. Patterson, 1776 Thirty-ninth Avenue East, Vancouver; Secretary, D. A. Munro, 70 Seventh Avenue West, Vancouver. Meets at I.O.O.F. Hall, Hamilton Street, Vancouver, at 7.30 p.m. on first Tuesday and 2.30 p.m. on third Sunday.

Sawmill Filers & Sawyers' Association—President, D. B. Firth, 2878 Silver Street, McKay; Secretary, Geo. Gray, 1638 First Avenue East, Vancouver. Meets at Eagles' Hall, 535 Homer Street, Vancouver, at 2.30 p.m. on first and third Sundays in month.

Seafarers' Union of B.C., The Federated—President, A. Williams, 108 Main Street, Vancouver; Secretary, W. Donaldson, 523 Broadway West, Vancouver.

Seamen's Union of the Pacific—President, Andrew Furuseth, 59 Clay Street, San Francisco, Cal.; Secretary, G. Lawson, 59 Clay Street, San Francisco, Cal.; Business Agent, R. Townsend, 153 Cordova Street, Vancouver. Meets at Vancouver at 7 p.m. every Monday.

Sheet Metal Workers, Local No. 280—President, H. J. Hailmare, 1225 Seventh Avenue West, Vancouver; Secretary, R. J. Wardrop, 1225 Fifteenth Avenue East. Meets at 319 Pender Street at 8 p.m. on second and fourth Thursdays.

Soft Drink Dispensers' Union, No. 676—President, Frank McCann, 1423 Eleventh Avenue East, Vancouver; Secretary, T. J. Hanafin, 2376 Sixth Avenue West, Vancouver. Meets at 319 Pender Street West, Vancouver, at 2.30 p.m. on first Sunday in month.

Steam Engineers, Canadian Society of Certified, Headquarters No. 1—President, R. Wray, 848 Twenty-third Avenue East, Vancouver; Secretary, H. Isherwood, 858 Sixty-sixth Avenue East, South Vancouver. Meets on second and fourth Mondays in month at 152 Hastings Street West, Vancouver, at 7.30 p.m.

Stage Employees, Local No. 118—President, J. O'Brien, 310 London Building; Secretary, G. W. Allen, 310 London Building. Meets at 310 London Building on second Friday in month at 10 a.m.

Steam & Operating Engineers, International Union of, Local No. 844—President, L. V. Greenwood, Vancouver; Secretary, G. A. Sparks, 176 Sixteenth Avenue, Vancouver. Meets at 319 Pender Street West, Vancouver, at 8 p.m. every Tuesday.

Steam Shovel & Dredgermen, International Brotherhood of, Local No. 62—Secretary, G. D. Lamont, 95 Powell Street, Vancouver.

Stereotypers & Electrotypers, International Union of, Local No. 88—President, W. Bayley, c/o Daily Province, Vancouver; Secretary, A. Birnie, 2626 Commercial Drive, Vancouver. Meets at 319 Pender Street West at 4 p.m. on second Monday in month.

Stone-cutters' Association of North America—Secretary, F. Rumble, 196 Gothard Street, Vancouver. Meets at 319 Pender Street West on first Tuesday in month at 8 p.m.

Street & Electric Railway Employees of America, Amalgamated Association of, Division No. 101—President, F. A. Hoover, 2409 Clark Drive; Secretary, W. H. Cottrill, 7306 Main Street, Vancouver. Meets at A.O.F. Hall, Mount Pleasant, at 10.15 a.m. on first Monday and 7 p.m. on third Monday.

Switchmen's Union of North America, Local No. 111—Secretary, M. M. Kenney, 532 Nelson Street, Vancouver.

Tailors' Union of America, Journeymen, Local No. 178—President, A. Nuttall, 1626 Parker Street, Vancouver; Secretary, C. McDonald, P.O. Box 503, Vancouver. Meets at 319 Pender Street West, Vancouver, at 8 p.m. on first Monday in month.

Teamsters, Chauffeurs, Stablemen & Helpers, No. 371 (Bakery Drivers)—President, J. Brightwell, 23 Fifth Street East, Vancouver; Secretary, H. A. Bowron, 2849 Burns Street, Vancouver. Meets on second Thursday of each month at 319 Pender Street West, Vancouver, at 8 p.m.

Teamsters, Chauffeurs, Stablemen & Helpers, No. 464 (Milk Wagon Drivers and Dairy Employees)—Secretary, B. Showler, 1120 Robson Street, Vancouver. Meets at 319 Pender Street West on second and fourth Fridays in month at 8 p.m.

Teamsters, Chauffeurs, Stablemen & Helpers, No. 655 (General Teamsters and Chauffeurs)—Secretary, B. Showler, 1120 Robson Street, Vancouver. Meets at 319 Pender Street West, Vancouver, on second and fourth Wednesdays in month at 8 p.m.

Telegraphers' Union of America, Division 65, Commercial (Canadian Government Radio Division)—President, J. Daniel, Radio Station, Point Grey; Secretary, W. S. Parkin, Radio Station, Point Grey.

Telegraphers' Union of America, No. 52, Commercial (Canadian Press Division)—Secretary, J. A. McDougall, 1633 Twelfth Avenue East, Vancouver.

Theatrical Stage Employees & Moving Picture Machine Operators of the United States and Canada, International Alliance of, Local No. 118—President, Jas. O'Brien, 504 Hastings Street East, Vancouver; Secretary, G. W. Allin, P.O. Box 711, 2835 Stephens Street, Vancouver. Meets at 308 London Building, Vancouver, at 9.30 a.m. on second Friday in month.

Theatrical Stage Employees & Moving Picture Operators of the United States and Canada, International Alliance of, Local No. 348—President, W. Tenney, 506 Hornby Street, Vancouver; Secretary, Locksley Clark, 2991 Vanness Street, South Vancouver. Meets at 310 London Building on first Sunday in month.

Typographical Union, International, Local No. 226—President, C. H. Collier, P.O. Box 66, Vancouver; Secretary, R. H. Neelands, P.O. Box 66, Vancouver. Meets at 319 Pender Street West, Vancouver, at 2 p.m. on last Sunday in month.

Wood-workers, Amalgamated Society of Shipyard, Branch No. 2—President, A. E. Arnold, 303 First Street East, North Vancouver; Secretary, W. Bray, 72 Sixteenth Avenue West, Vancouver. Meets at F.L.P. Hall, 148 Cordova Street West, Vancouver, first and third Tuesdays of each month.

Vernon.

Typographical Union, International, Local No. 541—President, Everett Law, Penticton; Secretary, H. E. Arnold, Box 541, Vernon. Meets at Vernon at 8 p.m. on last Saturday in month.

Victoria.

Barbers, Journeymen, International Union of, Local No. 372—President, J. A. Green, 1242 Government Street, Victoria; Secretary, G. W. Wood, 1242 Government Street. Meets at 1311 Government Street on fourth Monday in month at 8 p.m.

Bridge, Dock & Wharf Builders, No. 2415—President, D. Hodnett, Esquimalt Road, Esquimalt; Secretary, E. E. Goldsmith, 2565 Grahame Street, Victoria. Meets at Trades Hall, Broad Street, Victoria, first and third Mondays in each month.

Bridge, Structural & Ornamental Ironworkers, International Association of, Local No. 185—President, D. Kennedy, Box 236, Victoria; Secretary, A. M. Davis, Box 236, Victoria. Meets at Trades Hall at 8 p.m. on first and third Wednesdays in month.

Boilermakers, Iron Shipbuilders & Helpers of America, International Brotherhood of, Local No. 191—President, G. Penketh, 2517 Blanshard Street, Victoria; Secretary, H. Prior, 1225 Juno Street, Esquimalt. Meets at Foresters' Hall at 8 p.m. on second and fourth Mondays.

Bookbinders, International Brotherhood of, Local No. 147—President, J. A. Wiley, 141 Clarence Street, Victoria; Secretary, W. W. Laing, 125 Linden Avenue, Victoria. Meets at Trades Hall, Broad Street, Victoria, at 8 p.m. on fourth Friday in month.

Brewery, Flour, Cereal & Soft Drink Workers of America, International Union of United, Local No. 280—President, G. W. Brewer, Tolmie Avenue and Douglas Street, Victoria; Secretary, Ernest Orr, 58 Sims Avenue, Saanich. Meets at Trades Hall, Broad Street, Victoria, at 8 p.m. on second Tuesday in month.

Bricklayers, Masons & Plasterers of America, International Union of, Local No. 2—President, Fred. Plows, corner of King's Road and Grahame Street, Victoria; Secretary, Alex. Riach, 2399 Florence Street, Victoria. Meets at K. of P. Hall, Victoria, at 8 p.m. on second Monday in month.

Carpenters & Joiners of America, United Brotherhood of, Local No. 2651—President, A. J. Shaw, 1043 Victoria Avenue, Oak Bay; Secretary, Joseph Ley, Box 770, Victoria. Meets at Trades Hall, Broad Street, Victoria, at 8 p.m. on second and fourth Tuesdays.

Carpenters & Joiners of America, United Brotherhood of, Local No. 1598—President, R. McLeod, 1239 Seaview Avenue, Victoria; Secretary, A. E. Smith, 1622 Camosun Street, Victoria. Meets at Trades Hall, Broad Street, Victoria, at 8 p.m. on first Monday.

Carpenters & Joiners, United Brotherhood of (Ship Carpenters & Caulkers)—President, R. H. Macleod, 2663 Fifth Street, Victoria; Secretary, A. E. McLennan, 2523 Government Street, Victoria.

Carpenters & Joiners (Bridge Workers), United Brotherhood of, Local No. 2415—Secretary, E. E. Goldsmith, 2565 Grahame Street, Victoria.

Cigarmakers, International Union of America, Local No. 211—President, Alex. Ross, 576 Johnson Street, Victoria; Secretary, A. H. Ross, 1216 Styles Street, Victoria.

Civic Employees, Local No. 50—President, James Walker, 221 Robertson Street, Victoria; Secretary, Isaac Byers, 1272 Balmoral Road, Victoria. Meets at Trades Hall, Broad Street, Victoria, at 8 p.m. on second Wednesday.

Civil Service Association, Local No. 76—President, H. F. Hirst, Land Registry Office, Victoria; Secretary, A. M. D. Fairbairn, Parliament Buildings, Victoria. Meets at Campbell Building, Victoria, when called.

Civil Servants of Canada, Amalgamated—President, C. Sivertz, 1278 Denman Street, Victoria; Secretary, G. C. Bloomfield, 2528 Garden Street, Victoria.

Dominion Express Employees, Brotherhood of, No. 20—President, C. Little, 2723 Mount Stephen Avenue, Victoria; Secretary, Miss M. H. Frank, 1120 Pembroke Street, Victoria.

Electrical Workers, International Brotherhood of, Local No. 230—President, D. W. Dopp, 1328 Grant Street, Victoria; Recording Secretary, F. Shapland, 828 Broughton Street, Victoria; Secretary, W. Reid, 2736 Asquith Street, Victoria. Meets at Labour Hall, Broad Street, at 8 p.m. every Monday.

Steam & Operating Engineers, International Union, Local No. 446—President, T. Carson, 651 Belton Avenue, Victoria; Secretary, H. Geake, 114 Howe Street, Victoria. Meets at K. of P. Hall at 8 p.m. on second and fourth Tuesdays.

Firefighters, Civic, Local No. 13—President, J. Crowther, Headquarters Fire Hall, Victoria; Secretary, A. Poole, Headquarters Fire Hall, Victoria. Meets at Headquarters Fire Hall, Cormorant Street, at 8 p.m. on first Monday of each month.

Hod Carriers, Building & Common Labourers, International Union of, No. 634—President, B. G. Bertneir, 1279 Denman Street, Victoria; Secretary, J. Wilkerson, 3 Carey Road, Victoria.

Hotel & Restaurant Employees, International Alliance, Local No. 459—President, F. W. Jones, Box 14, Victoria; Secretary, W. H. Hatcher, Box 14, Victoria. Meets at Room 1, 1305 Government Street, at 8.15 p.m. on third Tuesday and 3.15 p.m. on first Tuesday in month.

Locomotive Firemen & Engineers, Brotherhood of, Local No. 690—President, Harry Richmond, Russell Street, Victoria; Secretary, H. J. Brown, 405 John Street, Victoria.

Longshoremen's Association, International, Local No. 38-46—President, John Moss, Box 1315, Victoria; Secretary, Thomas Bourne, Box 1315, Victoria. Meets at 565 Johnson Street at 7.30 p.m. on second Tuesday of each month.

Machinists, International Association of, Local No. 456—President, James Turnbull, 2020 Fernwood Road, Victoria; Secretary, C. B. Lester, 215 Hampton Road, Victoria. Meets at K. of P. Hall, Victoria, at 8 p.m. on second and fourth Thursdays.

Maintenance-of-way Employees & Railway Shop Labourers, United Brotherhood, Local No. 2824—President, W. A. Wright, 601 Kelvin Road, Victoria; Secretary, G. E. Wilkinson, 50 Sims Avenue, Victoria.

Metal Workers' International Alliance, Local No. 134—President, E. Lamphere, 2636 Roseberry Avenue, Victoria; Secretary, J. J. Bell, 2251 Willows Road, Victoria.

Meat Cutters & Butchers. International Union of, Local No. 485—President, T. Greenslade, 2734 Quadra Street, Victoria; Secretary, R. Elliott, 2347 McBride Avenue, Victoria. Meets at Labour Hall, Broad Street, Victoria, at 8 p.m. on second and fourth Mondays in month.

Moulders, International Union of North America, Local No. 144—President, J. Stewart, 1231 Pandora Avenue; Secretary, J. Dakers, Box 127, Victoria; Financial Secretary, W. Kaye, 421 Portage Street, Victoria. Meets at K. of P. Hall at 8 p.m. on second Wednesday in month.

Musicians, American Federation of (Musicians' Mutual Protective Association), Local No. 247—President, Stanley Peele, 1214 Oxford Street, Victoria; Secretary, A. E. Greenwood, 20 Brown Block, Victoria. Meets at K. of P. Hall at 2 p.m. on first Sunday in month.

Painters, Decorators & Paperhangers of America, Brotherhood of, Local No. 5—President, Mr. Jackson, Room 11, Trades Hall, Broad Street, Victoria; Secretary, Jas. Aspinall, 520 Williams Street, Victoria. Meets at 8 p.m. at Trades Hall on first and third Mondays of each month.

Pattern Makers' League of North America—President, John L. Parkinson, 1235 Lyall Street, Victoria; Secretary, James McCahill, 615 Wilson Street, Victoria. Meets at K. of P. Hall at 8 p.m. on second Thursday.

Photo Engravers, International Union of North America (Auxiliary of Vancouver), Local No. 54—Secretary, Frank M. Day, c/o Engraving Department, "The Times," Victoria.

Pile Drivers & Wooden Bridgemen, No. 185—President, Joseph Munroe, 1117 Hillside Avenue, Victoria; Secretary, Harry Stewart, 621 Hillside Avenue, Victoria. Meets at Trades Hall at 8 p.m. on first and third Mondays.

Plasterers & Cement Finishers of the United States, International Association of, Local No. 450—President, H. Passmore, Middleton Avenue, Victoria; Secretary, L. Hutchison, 100 Burnside Road, Victoria. Meets at Green Block, Broad Street, at 8 p.m. on second Thursday of month.

Plumbers & Steam Fitters of the United States and Canada, United Association of, Local No. 32—President, J. Fox, 2858 Austin Avenue; Secretary, H. Johnson, Box 1498. Meets at K. of P. Hall at 8 p.m. on second and fourth Tuesdays.

Policemen's Federal Association, Local No. 24—President, H. F. Jarvis, 1536 Westall Avenue; Secretary, G. A. Allen, 1104 King's Road, Victoria. Meets at 25 Fisgard Street at 8.15 p.m. on second Tuesday in month.

Postal Workers, Amalgamated, Local No. 134—President, G. Bloomfield, 2014 Marion Street; Secretary, C. Sivertz, 1278 Denman Street, Victoria. Meets at P.O. Building at 8 p.m. on third Tuesday in month.

Printing Pressmen & Assistants, International Union of North America, Local No. 79—President, Thomas Nute, Michigan Street, Victoria; Secretary, Robert C. Malcolm, 1405 Grant Street, Victoria. Meets at Retail Clerks' Hall, Broad Street, at 8 p.m. on second Monday in month.

Railway & Steamships Clerks, Freight Handlers, Express & Station Employees, No. 1137—President, E. Leonard, 1221 Whittaker Street, Victoria; Secretary, V. I. Duncan, 832 Tolmie Street, Victoria. Meets at Trades Hall at 8 p.m. on first Thursday in month.

Railway Trainmen, Brotherhood of, Local No. 613—President, W. T. Campbell, 2603 Douglas Street, Suite 2; Secretary, A. Brooks, 617 Catherine Street, Victoria West. Meets at A.O.F. Hall, Broad Street, Victoria, at 8 p.m. on second Tuesday and last Friday in month.

Retail Clerks, International Association of, Local No. 604—President, J. Talbot, 1737 Bank Street, Victoria; Secretary, H. H. Hollins, Trades Hall, Broad Street. Meets at Trades Hall, Broad Street, at 8 p.m. on first and third Tuesdays.

Sheet Metal Workers, Amalgamated, International Alliance of, Local No. 134—President, E. Lamphere, 2636 Roseberry Street, Victoria; Secretary, J. J. Bell, 2251 Willows Road, Victoria. Meets at 842 North Park Street at 8.30 p.m. on first Thursday.

Street & Electric Railway Employees of America, Amalgamated Association of, Division No. 109—President, R. W. Munn, 1237 Johnson Street, Victoria; Secretary, R. A. C. Dewar, 1218 Johnson Street, Victoria. Meets corner Broad and Yates Streets, Victoria, at 10 a.m. and 7 p.m. on second Tuesday in month.

Stonecutters' Association of North America (Journeymen)—President, J. Mackay, Box 507, Victoria; Secretary, Jas. Barlow, Box 507, Victoria. Meets at 8 p.m. on second Thursday.

Tailors' Journeymen Union of America, Local No. 142—President, John Morrison, Harriet Road; Secretary, Ed. Christopher, Box 387, Victoria. Meets at A.O.F. Hall, Broad Street, Victoria, at 8 p.m. on first Tuesday in month.

Teamsters & Chauffeurs, General, International Brotherhood of, Local No. 365—President, S. Holdridge, 1104 Johnson Street, Victoria; Secretary, John Scoulan, 350 Robertson Street, Victoria. Meets at Trades Hall, Broad Street, at 8 p.m. on first Tuesday.

Theatrical Stage Employees & Moving Picture Machine Operators of the United States and Canada, International Alliance of, Local No. 168—President, S. Evans, Fairfield Hotel, Victoria; Secretary, Robert Freeman, P.O. Box 47, or Fairfield Hotel, Victoria. Meets at Trades Hall, Broad Street, Victoria, at 11.15 p.m. on first Thursday in month.

Typographical Union, International, Local No. 201—President, John Chrow, 1030 Burdette Avenue, Victoria; Secretary, Chas. F. Banfield, 642 Craigflower Road, Victoria. Meets at Trades Hall, Broad Street, Victoria, at 2 p.m. on last Sunday in month.

Upholsters & Trimmers, No. 25—President, C. E. Copeland, 1330 Minto Street, Victoria; Secretary, J. Gray, 1179 Monterey Avenue, Victoria. Meets at K. of P. Hall, North Park Street, Victoria, at 8 p.m. on second and fourth Mondays in month.

Wellington.

Railway Carmen of America, Brotherhood of, Local No. 50—President, Thomas M. Biggs, Wellington P.O.; Secretary, T. Richards, Wellington. Meets at Wellington on third Thursday in month at 8 p.m.

TRADES AND LABOUR COUNCILS.
(One Big Union.)

Prince Rupert—Chairman, S. V. Cox, Box 217, Prince Rupert; Secretary, N. Booth, Box 217, Prince Rupert. Meets in O.B.U. Hall at 8 p.m. every Tuesday.

Vancouver—President, R. W. Hatley, 305 Pender Street, West, Vancouver; Secretary, J. G. Smith, 305 Pender Street West, Vancouver. Meets in Pender Hall at 8 p.m. on third Wednesday of each month.

B.C. UNITS OF THE O.B.U.

Cranbrook.

Lumber Workers' Unit—Secretary, J. L. Peterson, Box 18, Cranbrook.

Kamloops.

Lumber Workers' Unit—Secretary, W. S. Kilner, Box 812, Kamloops.

Prince George.

Lumber Workers' Unit—Secretary, H. P. Hansen, P.O. Drawer 20, Prince George.

Prince Rupert.

Fisheries & Water Products Industrial Union—Secretary-Treasurer, N. Booth, Box 217, Prince Rupert. Meets in O.B.U. Hall at 8 p.m. on second Sunday of each month.

Lumber Workers' Unit—Secretary, J. H. Burrough, Box 838, Prince Rupert.

Metalliferous Miners' Industrial Union—Secretary-Treasurer, N. Booth, Box 217, Prince Rupert.

Vancouver.

Lumber Workers, Headquarters—Secretary, J. M. Clarke, 61 Cordova Street, Vancouver.

Pile Drivers and Wooden Bridgemen's Unit—President, T. L. Hewett, 804 Pender Street, Vancouver; Secretary, E. Horner, 804 Pender Street, Vancouver. Meets at 804 Pender Street every Monday at 8 p.m.

LABOUR DISPUTES IN BRITISH COLUMBIA IN 1921.

The labour disputes recorded in this Province during 1921 numbered 21, which indicates a state of affairs very different from that of the previous year, when 68 disputes were recorded. In 1919 there were 44 and in 1918 there were 28.

In so far as this reduction in the number of disputes speaks of less strained relations between capital and labour, it will be accepted as a good sign. However, the chief explanation of the change is probably to be looked for in other directions. The year 1920 was a time of great activity in the two large groups of lumbering and mining industries, in which the majority of that year's disputes occurred. For a large portion of 1920 labour in these industries was difficult to obtain, and this gave the workers confidence in putting forward demands for improved wages and conditions, and in resorting to strikes if the demands were not complied with. In 1921 the business boom had disappeared, and many employers were quite indifferent as to whether they continued their operations—or, indeed, preferred to suspend work entirely. In these circumstances, in every centre in the Province, there were numbers of men gathered who were unable to find work of any kind, and with those who were in employment the principal consideration was to remain at work as long as possible.

The Contrast of Two Years.

In the Department's report last year attention was called to the new policy which had become prevalent of suddenly springing a strike upon employers in isolated parts of the Province and relying upon getting a quick result. Little or no strike fund was needed for this policy. It was obvious, of course, that if employers cared to close down their operations they could soon defeat strikers who had little financial backing; but the latter did not find it difficult to obtain employment elsewhere, and an employer was not always sure of obtaining other workers, or of finding a new crew of employees any better to handle than the old one. Therefore it was often less embarrassing to yield to demands than to resist them, and the new unions were able to claim a considerable amount of success for their policy. In 1921 all this was changed. Employers, who anticipated little or no financial advantage from keeping their works going, were often willing to operate only after they had successfully insisted on lower wages or less restrictive conditions. When these demands began to be imposed by employers the new unionism was found almost helpless to resist them; and as the older weapons of the older unionism had been very widely discarded in the lumbering group of industries, the chances of organizing a successful strike became very slight indeed.

Comparatively few disputes involving a stoppage of work were reported during the year. Most of those which occurred were in the nature of resistance to employers' demands, and in the majority of cases the result was favourable to the employer or else no definite decision was reached. In a very much larger number of cases a downward revision of wages was made without any dispute coming to a head.

The Strike of Printers.

An exception to this general tendency is afforded by the strike of printers, which, in the matter of loss of employment, was the biggest dispute of the year in the Province. This dispute, in one shape or other, extended over the greater part of the year.

The question of reducing the number of hours in the normal working-week from 48 to 44 had been active for a few years, both in Canada and the United States. In 1919 an understanding was arrived at, looking to a reduction of the working-week, to become effective in the trade throughout both countries on May 1st, 1921. The union officials assert, and the employers deny, that this understanding amounted to a definite arrangement. Some months before the date mentioned, however, the employers requested that the demand for the adoption of a shorter working-week be withdrawn.

In the closing days of 1920, or more than four months before the discussion on this main question was to come to an issue, the job-printing employers of Vancouver asked for the acceptance of a revised scale of wages, involving a reduction as from January 1st, 1921. The unsatisfactory condition of business and the downward tendency in the cost of living

were pointed to as reasons for such change. The proposed new scale was strongly objected to, however, with the result that the job-printing offices in the city were closed down from the 1st to the 18th. Work was then resumed at the former scale of wages.

BASIS OF SETTLEMENT IN VICTORIA.

On May 1st, acting on instructions from the headquarters of the International Typographical Union at Indianapolis, the job-printers of Vancouver, Victoria, and some of the smaller cities in the Province ceased work with the object of enforcing acceptance of the 44-hour week. In Victoria the strike lasted only two weeks. A conference was then held, at which the whole position was reviewed, including that of the printers in the newspaper offices, who were not affected by the dispute. The latter were receiving $40.50 per week of 45 hours, while the jobbing-office men were receiving the same weekly wage for 48 hours. As the result of the conference the Victoria employers agreed to recognize the 44-hour week, and on the question of pay a compromise was arrived at. The jobbing-men, it was arranged, should receive 90 cents an hour, which was the same hourly rate that was being paid to the newspaper-men, but with one hour a week less would bring the weekly rate to $39.60. It was agreed that this settlement should stand until the end of the year.

In the Interior of the Province the men left work on May 2nd. Most of the strikers were replaced by other men, and work was resumed in a few weeks. At Prince Rupert four compositors were on strike from May 1st to 14th, and work was resumed on the latter date on a 44-hour week basis.

A LENGTHY DISPUTE IN VANCOUVER.

In most of the smaller centres in the Province an early resumption of work was brought about, but in Vancouver the dispute dragged on from month to month. The majority of the employers continued to hold out against the demand for a 44-hour week. A number of offices were closed down for a time, but gradually, in the course of two or three months, they were reopened, though in some cases with a smaller staff than before. At the end of the year the number of men reported as being on strike in the city was between 50 and 60, and they were receiving strike pay on a liberal scale, $17 per week being paid to single men and $20 to $30 to married men, according to the number of dependents.

Under the settlement at Victoria, referred to above, the rate of 90 cents per hour was applicable to machine operators, compositors, cylinder pressmen, and bookbinders. Platen pressmen and other employees received the same percentage of increase.

DISPUTE IN SHIP-REPAIR PLANT.

The early part of the year witnessed an extensive dispute at the ship-repair plant at Esquimalt, where 700 men were being employed. Notice was given early in January of an all-round cut of 50 cents per day in wages, the employers contending that conditions as to cost of living, etc., which had occasioned various advances of pay in recent years, were no longer prevalent. On January 19th, some days after the new scale had come into effect, about 200 metal-workers, including blacksmiths, boiler-makers, plate and foundry workers, left work. Similar action had already been taken by about 25 electricians on the day the cut was made. A number of smaller firms in Esquimalt and Victoria were also affected by the dispute. At Vancouver only the pattern-makers came out. A good deal of work was tied up for a time, but after the dispute had been in progress for about a week differences developed among the men who were out, and this resulted in the majority of them returning to work on February 1st on the employers' terms. It was reported that some portion of work was let to sub-contractors, and that this obviated any further contention.

JAPANESE AND WHITE LUMBER-WORKERS.

A dispute in the lumber trade in Vancouver in the following month had certain peculiar features. The Japanese workers who were engaged in the handling, piling, and landing of lumber at one of the mills were given notice of a reduction in pay from 30 cents to 25 cents per hour. About 75 of them went on strike on February 12th. After one day's stoppage the mill resumed operations with a crew of white men, who were paid 36 cents per hour for single men and 40 cents per hour for married men for a working-day of 10 hours. The Japanese strikers were joined by three white men workers, and the O.B.U. picketed the approaches to the mill, but work under the new arrangement went forward without disturbance.

SCHOOLS CLOSED BY A STRIKE.

A dispute which resulted in the closing of most of the public schools in New Westminster from February 14th to 21st was caused by a demand for increased pay by the teachers. A schedule of salaries had been in effect since the beginning of 1920, and under its provisions the increments of teachers' salaries for 1921 would have amounted to about $8,000. It was represented by the teachers that some of the increases were inadequate, and they submitted a revised scale of salaries, which, they said, would put New Westminster in line with the other cities of the Province. This revised scale called for the addition of approximately $25,000 to the schedule of 1920. On January 24th the School Board went minutely into the salary question, and agreed to certain increments totalling $13,285. The teachers expressed dissatisfaction with this, and asked that the matter be submitted to arbitration, as provided for in the "Schools Act"; but the Board intimated that their decision was final. The teachers thereupon, on February 12th, informed the Board that, unless the latter would meet the executive of the Teachers' Association and make arrangements as to salaries mutually satisfactory to both parties, the teachers would not be in school on the following Monday, the 14th.

It was found impracticable at such short notice to get the trustees together, and the consequence was that, with the exception of two public schools and the whole of the staff of the T. J. Trapp Technical School, the teachers, numbering 17 males and 63 females, absented themselves from their duties for a week. On the 19th a conference was held between three members of the Board, three teachers, and three delegates appointed by the President of the Board of Trade. A basis of settlement was formulated, which included recognition of the Teachers' Association by the Board of School Trustees. An agreement was signed under which all salaries were to be adjusted by a committee of trustees and teachers, and in the event of failure to agree the matter to be placed in the hands of an Arbitration Board. The strike was called off and the schools reopened on the 21st.

AN INQUIRY AND A STRIKE.

The wages and working conditions of the electrical workers employed by the British Columbia Electric and subsidiary companies came under review in January by a Board established to deal with these matters, and consisting of M. H. McGeogh, Chairman, and A. G. McCandless and E. H. Morrison, representing the company and the employees respectively.

In a unanimous report the Board, in view of the signs of a decreasing cost of living, did not recommend any increase in wages, and added: "It might appear that the operators are receiving good wages and more money than is paid in most of the other companies' power-houses for similar work, but we do not think this is an opportune time to make any reduction of wages." They recommended the modification of a number of clauses in the existing agreement which, the company had claimed, made the operating of their utilities very costly.

The company, not being satisfied with the Board's decision as to wages, announced a reduction of 10 per cent., except in the case of linemen and wiremen. This led to the electrical workers, numbering 200, leaving their work on February 22nd. Work was resumed on March 8th under the same conditions as to wages which obtained prior to the dispute.

MINERS' TWO VOTES AT STEWART.

A dispute in which two votes of the workers were taken, the second reversing the decision of the first, occurred at Stewart in May.

The operators of the Premier Mine laid off a number of men, and gave notice to those remaining in their employ of the following reductions in daily pay: Miners, from $6.50 to $5.50; muckers, from $6 to $5; and labourers, from $5.75 to $4.75. The men decided by ballot not to accept these reductions and left work on May 10th, about 250 being affected, including a number who were employed by the company in Alaska Territory. An offer some days later to meet the employers half-way was not accepted. On June 2nd another vote was taken on the question of resuming work on the employers' terms. This was agreed to by a large majority and the men went back to work on June 3rd.

CIGAR-MAKERS' DISPUTE.

The introduction of new machinery in the cigar-making industry of Vancouver led to a dispute with the workpeople on May 31st and some 50 men left their employment. Under the

changed conditions it was found possible for the employers to utilize the services of women and girls in a greater degree than before. This was done, and the new arrangement at the end of the year seemed likely to become permanent, no formal settlement of the dispute having been arrived at.

OPEN SHOP IN THE SHOE TRADE.

Eighty-one employees (60 men and 21 women) in the boot and shoe manufacturing industry were affected by a dispute which arose out of the request of a firm in Vancouver for a revision of the wage scale. The firm contended that the existing scale was too high for conditions under which they were competing with Eastern manufacturers, and they also asked that the employees should take into consideration the reduced cost of living. Negotiations were opened with six departments, with four of which satisfactory agreements were made, subject to the scale being ratified with the Boot and Shoe Workers' Union. One other department was not to receive any change, which left only the upper-cutters to be dealt with. No agreement, however, could be reached between the firm and the upper-cutters.

The firm decided to put into effect a new scale as from the week ended July 19th. The union called a special meeting and voted a strike, which began on July 21st. Suggestions for arbitration were made, but while the union wished to arbitrate with reference to the four upper-cutters, the firm required that the arbitration should cover the wage scale for the whole works. Accordingly no progress was made along that line. A request that the firm should agree to hire only members of the union, or those willing to become members, was also objected to.

On October 12th the firm wrote to all their employees personally, saying their positions would be kept open until the 17th, after which date steps would be taken to fill same. Manufacturing had been restarted on the 10th, with those who were willing to come back and others the firm were able to obtain. Negotiations followed and a friendly settlement was arrived at, work being resumed on November 8th under the open-shop plan.

The remaining disputes do not appear to have had any particular features, and their nature is briefly indicated in the summary given below. In all, the disputes of the year affected 3,522 workers and the estimated loss in working-time was 52,632 days, these being considerably less than the corresponding figures for last year.

The following is a brief summary of the disputes which occurred in the Province during 1921:—

Industry or Occupation.	Particulars.	No. of Employees affected.	Time lost in Working-days.
Loggers— Jackson Bay	Commenced November 16th, 1920. Men objected to being put on piece-work. Work resumed on January 28th with new crew	60	1,920
Shingle-workers— New Westminster	Commenced December 31st, 1920. Owing to a 20-per-cent. cut in wages. Most of men affected returned to work on January 10th	100	800
Printers— Vancouver and other cities	Employers in Vancouver asked for a revised scale of wages, involving a reduction. Most of the printing-offices in the city were closed down from January 1st to 18th, when work was resumed on the old terms. On May 1st a large number of printers in the Province left work, in order to enforce a prior understanding in favour of a 44-hour working-week to come into effect on that date. In Victoria a compromise resulted in men returning to work in two weeks, the scale of pay being altered from $40.50 for 48 hours to $39.60 for 44 hours. There was a general stoppage in the job-printing offices in Vancouver, but most of them were reopened after some weeks, some on the union terms and others on the employers'. The dispute followed a similar course in the smaller cities. No formal general settlement had been arrived at by the end of the year	From 50 to 300	16,737
Pattern-makers— Burnaby	Commenced January 15th. Against a reduction in wages. No definite settlement, but early in March employers stated that they were able to secure labour on their own terms	22	350
Metal-workers— Esquimalt	Commenced January 19th. Employers gave notice of an all-round wage cut, stating that cost of living had come down. Differences developed among the men, the majority of whom returned to work on February 1st on employers' terms.	250	2,750
	Carried forward	732	22,557

Industry or Occupation.	Particulars.	No. of Employees affected.	Time lost in Working-days.
	Brought forward	732	22,557
Pattern-makers— Vancouver	Commenced January 19th. Cause and nature of dispute similar to above	30	330
Brewery-workers— New Westminster	Commenced February 2nd. Arose out of discharge of an old employee who was an ex-secretary of the union. Arbitration agreement put into force and dispute settled amicably. Work resumed on February 21st	22	340
Japanese lumber-workers— Vancouver	Commenced February 12th. Japanese lumber-pilers, etc., struck against pay being reduced from 30 to 25 cents an hour. White men were engaged at 36 and 40 cents an hour, and though the O.B.U. picketed the approaches to the mill, work went forward undisturbed	75	400
School-teachers— New Westminster	Commenced February 14th. Teachers demanded increase of pay in excess of that provided by scheduled increments. The School Board offered a compromise which teachers refused, and the School Board in turn refused a request for arbitration, whereupon a strike was called. A week later a conference, called by the President of the Board of Trade, resulted in a settlement and the principle of negotiation by conference, followed if necessary by arbitration, being agreed to	80	400
Electrical workers— Vancouver, Victoria, and New Westminster	Commenced February 22nd. In protest against a 10-per-cent. reduction in wages. Work resumed on March 8th with wages unchanged	200	2,400
Granite-cutters— Vancouver	Commenced March 1st. In protest against a reduction. Work resumed on April 15th on a compromise	18	600
Plasterers— Vancouver	Commenced March 23rd. Employers and men differed as to proper rates of pay. Differences varied between $7.50 and $10 per day. Men soon returned to work, without formal settlement, mostly at their former wages.	8	40
Machinists— Prince Rupert	Commenced May 10th. Men on gas-boat repair-work objected to being paid the same as for construction-work—viz., 78 cents per hour. Dispute amicably settled, employers agreeing to pay 82½ cents per hour for repair-work	20	120
Miners— Stewart	Commenced May 10th. Against a reduction of pay. On June 2nd a vote by the men decided in favour of going back on employers' terms and work was resumed on June 3rd	250	5,000
Cigar-makers— Vancouver	Commenced May 31st. Dispute arose over introduction of new machinery, which made it possible to replace male help with that of women and girls. No formal settlement	50	1,500
Firemen and oilers— Vancouver	Commenced July 20th. Men working on S.S. "Canadian Exporter" left work in protest against reduction of wages. Work resumed on August 22nd after mediation by the Dominion Department of Labour	71	1,765
Boot and shoe workers— Vancouver	Commenced July 21st. After negotiations, which were only partially successful, employers decided to put into effect a revised scale of wages, including a number of reductions. Strike was called in consequence. A friendly settlement was made on November 8th, work being resumed under the open-shop plan	81	6,885
Loggers— Ocean Falls	Commenced August 1st. Against working-day being increased from eight to ten hours. No formal settlement reported, but work when resumed was on employers' terms	285	1,995
Hop-pickers— Agassiz and Chilliwack	Commenced September 6th. For increased pay, which was granted after two days' stoppage	550	1,100
Shingle-makers— Coast District	Commenced on September 16th. Against a reduction in pay. Most of men affected were Chinese. A series of conferences with strikers' representatives were held and work resumed on September 23rd	600	3,600
Sawyers and packers— Lower Mainland	Commenced September 16th. Against a reduction in wages. Settlement by negotiations, work being resumed on the 26th	450	3,600
		3,522	52,632

REPORT OF THE INSPECTOR OF FACTORIES.

The work of factory inspection in the Province, which was formerly under the direction of the Department of Public Works, has been taken over during the past year by the Department of Labour. The duties of this important branch of service are now dealt with for the first time in the report of this Department.

Our own Province, in common with the rest of the Dominion, was passing through a period of readjustment during the past year, and it naturally followed that during that process many industrial workers were thrown out of employment or were employed on short time. A tendency which is noted by R. J. Stewart, Chief Factory Inspector, is that a number of firms who have established themselves in a business way have moved their factories to the suburbs of the cities, retaining for the convenience of their customers office-room only in the business sections. Mr. Stewart's report proceeds as follows:—

"This tendency on the part of the manufacturers adds to our having to spend a maximum of time and effort in order to accomplish a minimum of work, as our means of transportation, the street-car, does not pass anywhere near the great majority of these establishments.

ACCIDENTS LESS FREQUENT.

"We are pleased to be able to record a general decrease in the number of accidents occurring in the plants over which our supervision extends. Apart from the humanitarian point of view, both the employer and employee seem to have at last come to the conclusion that it is better to prevent an accident than to pay compensation. They also seem to realize that accident-prevention is a common ground on which employer and employee can work together for the benefit of both.

A CAMPAIGN AGAINST DUST.

"Authorities are agreed, and our own experience proves, that the working conditions and general health of the employees in any industry have a direct bearing on the accident frequency in that industry. In view of these facts, we have, while performing our duty of inspection, to take into consideration the conditions under which the employees are working. As an example, we may refer to one actual case of a plant we visited, where it was found that during the manufacturing process a great deal of fine dust was emitted from a battery of machines. This dust was allowed to go uncontrolled, consequently impregnating the air of the entire plant and causing injury to the health of the workmen. In addition to this, the general state of apathy in the plant, caused by this dust, together with its effect on illumination was very liable to become the direct cause of accidents.

"As a means of overcoming this, orders were issued to have a suction system installed for the purpose of removing the dust at its point of origin. These instructions were carried out in due time. Some two months later it was found that, although the fan, piping, and hoods that go with the modern exhaust system had been installed at considerable expense, the installation had proved inefficient and had been given up by the contractor and manager of the plant as unworkable.

"Following this visit, an appointment was made with the contractor to examine the system, and upon our suggestion a minor mechanical change was made, which resulted in this fine dust being removed to the satisfaction of all concerned.

REDUCING THE LABOUR TURNOVER.

"The conditions existing in factories under our supervision in which female employees predominate will, I feel safe in saying, compare favourably with those of a like character throughout the Dominion.

"A great many of these establishments have dining and rest rooms set apart for the exclusive use of their employees. Magazines and instructive literature are also placed at their disposal, and, generally speaking, it seems to be the policy of our manufacturers in this Province to attract the best class of help obtainable. An investment of this nature is a practical working-out of the theory that only when the employees are well provided for, mentally and physically,

the highest quality of workmanship can be attained, and when we notice the same employees during our periodical official visits we feel that the working conditions are such as to leave no cause for complaint. Consequently, these industries are not troubled by any great amount of labour turnover.

A Hint to Factory Proprietors.

"A great deal of trouble and expense would be saved some of the factory proprietors if they would, before signing a lease on prospective premises, become more conversant with those sections of the 'Factories Act' relating to ventilation, sanitation, etc., as these very important provisions are sometimes omitted in their anxiety to procure premises which, from their point of view, will suit their requirements.

"Our greatest trouble in this connection is generally caused by the small manufacturer, who after he has begun operations has notified the Factory Inspection office that he is operating a factory in a certain locality and requests us to inspect the same. We have frequently found that proper sanitary facilities have not been provided and that portions of the work-rooms were overcrowded. However, instances of this nature are the exception and not the rule, as we are very often consulted before the lease for a factory is finally signed. The nature of the industry is discussed and alterations and improvements, if necessary, are suggested, which as a general rule result in agreement being made between the landlord and the tenant relative to the financial consideration involved in carrying out the requirements of the 'Factories Act.'

Elevators.

"The inspection of elevators is one of the most important duties of the Inspectors, as the safety of thousands of people is daily at stake. In our large departmental stores and business blocks the elevator installations are generally placed in charge of competent persons, who are held responsible by their employers for the upkeep and safe operation of same, and whose duty it is to have replaced worn-out or defective parts.

"On the other hand, however, in some of the smaller buildings, in which one passenger-elevator is located, persons are sometimes placed in charge who know little or nothing about the working parts of modern elevator appliances.

"To emphasize the necessity of frequent inspection of the supporting cables, an instance may be mentioned of where, acting in compliance with instructions issued from the Factory Inspector's office, new hoisting-cables were installed on a passenger-elevator in a building ten stories in height, and during a further inspection nine months later these cables, owing to inferior material and workmanship, had to be renewed. When discovered by the Inspector these cables were in an extremely dangerous condition. This state of affairs was entirely unknown to the man in charge, and what may have happened had it not been discovered in time may easily be conjectured.

"I regret to have to report the loss of one life on a passenger-elevator, on which was an experienced operator who had under her training and supervision an applicant for a permanent position. This applicant was being instructed in the operation of the car on a Sunday, when there was supposed to be no traffic. She claimed to have had previous experience, although she was not in possession of an operator's licence issued by this Department. The fatality was caused by this applicant opening the shaftway door before the elevator was level with the landing, and while trying to bring the car level with the landing the passenger stepped into the car. This resulted in the operator losing control of the car as it moved upwards and caused the passenger to be crushed between the platform of the car and the top of the door-frame.

"There is one way, and one way only, in which accidents of this nature can be eliminated, and that is, as stated in previous reports on this subject, to have at least all passenger-elevators equipped with an approved interlocking device which will effectively prevent the door being opened before the elevator is level with or at a predetermined distance from the landing, and also to prevent the operation of the car until the door is closed and locked. Equipment of the nature which functions in the manner just described will accomplish more than all the rules and regulations that could be printed, is it forces the operators to do what the rules and regulations tell them they should do.

"Although no serious accidents have occurred on elevators while being operated by persons licensed by this Department, the hazard is there until such time as all elevator installations are equipped with an interlocking device.

CHILD-LABOUR.

"The stature of a child is not always a criterion of its age, and we have in the course of our visits found, upon investigation, an occasional child under the age of 14 working in a factory. When this fact is drawn to the attention of the management, they have invariably stated that the employee's age was given as 14 in the case of a boy, or 15 in the case of a girl.

"We have impressed upon the employers and managers that the mere assertion of an applicant that he is 14 years or over does not leave them, the employers, immune from prosecution under the Act for violation of that section, as it is the employer's duty to insist upon the production of a birth certificate or other equally reliable proof of age in all cases where the appearance of the applicant justifies that procedure.

"In conclusion, I wish to thank you and the Deputy Minister for the courtesy and encouragement shown this office throughout the year."

REPORT OF THE MINIMUM WAGE BOARD OF B.C.

To the Honourable the Minister of Labour,
Province of British Columbia.

Sir,—We have the honour to present the fourth annual report of the Minimum Wage Board of British Columbia, covering the year 1921.

Twenty-one meetings were held by the Board either in Victoria or Vancouver during the year. Most of these meetings have been taken up with discussion of specific cases and policies in connection with the administration of the Act and Orders.

A matter which has frequently been under consideration by the Board has been in relation to the question of schedules of wages, and the length of time during which inexperienced women and girls may work in the manufacturing industry for a lower wage than that to which experienced women are entitled. The question is a perplexing one by reason of the many varieties of work embraced by the Manufacturing Order. The Board has found it difficult to arrive at satisfactory terms for learners in the various groups within this section. It is recognized that a standard of efficiency in one class may be reached by an inexperienced worker in much shorter time than is required in some other branch.

Lower Wages during Learning Period.

In this industry personal investigations have been made covering many lines of work, and public meetings have been held in Victoria and Vancouver to hear the views of those interested in certain groups. At the Vancouver meeting the co-operation of a committee from the British Columbia Manufacturers' Association was offered to and accepted by the Board. The Trades and Labour Council also appointed a committee. These committees gave much time and exerted personal effort to arrive at groupings of the numerous branches of the industry, dividing them according to the length of the learning period. The reports from both sections having been received by the Board, further public meetings were held, but the matters dealt with were still under consideration at the close of the year. Further details concerning this question appear in the Appendix to this report.

In all these discussions the Board has had constantly in mind the danger of fixing a period either too long or too short for inexperienced workers to arrive at the legal minimum wage. If the scale of advance is too slow the workers become discouraged, and they pass from shop to shop and trade to trade in an attempt to find more rapidly some industry affording a wage with which they may support themselves. This is one of the primary factors in the increase in labour turnover. Owing to the recent distressing unemployment situation among the fathers, brothers, and husbands of these women, a growing number of girls are finding it impossible to remain for long periods at learners' wages. The help formerly received from the men of the family has frequently not only been cut off, but the women have had to contribute to the upkeep of the family.

The Principle of Apprenticeship.

On the other hand, employees must be given opportunity to acquire reasonable experience before employers may in fairness be required to pay the minimum wage. Manufacturers have to realize also that it is not necessary that employees should be experts before they attain this minimum. Too lengthy apprenticeship, too low wage scales, and insufficient instruction are factors—not always recognized—in reducing the supply of learners in some trades to the lowest point. Employers in certain well-defined occupations complain not only of the lack of applicants or learners offering, but of their lack of interest after entering a trade. At the same time some employers urge Minimum Wage Boards to set long terms and low wages for beginners, apparently failing to comprehened that it is the discouraging prospect of such long low-paid learning periods in occupations which at best are seasonal that fail to attract entrants, Such industries are likely to draw mostly those who lack initiative to seek more promising prospects, or who take them up as a passing fancy or a makeshift till better things offer. Particularly is this true of millinery and dressmaking.

The basic principle of apprenticeship should be that long learning periods be permitted only in those occupations which ultimately promise the competent worker promotion and adequate wages. The establishment of technical schools and millinery, dressmaking, and commercial classes in our public and high schools serve to overcome some of the obstacles encountered by the wholly untrained worker. The children passing through these classes, even though not trained perhaps for some special occupation, should bring to the industrial life of the Province educated hands and minds and a general knowledge and facility that ought to raise the standard of competence.

LICENCES.

Since the inception of the Minimum Wage Orders a system of licensing inexperienced adult employees has been adopted. In all, 529 licences have been issued, of which number to date 500 have been cancelled. The mercantile industry has used 156 of these licences and 135 of them have been revoked. In the laundry industry 125 have been issued and 120 nullified. There have been issued in the office occupation 44 licences, 42 of which have been rescinded. In the telephone and telegraph occupation 302 licences have been issued and the same number cancelled. The personal service occupation has required 1 licence, which has since been annulled. One licence has been issued in the manufacturing industry and is still in effect.

Licences are given for a specified time. Most of the cancellations have occurred owing to the expiration of the licences. In some instances they have been cancelled, not by lapse of time, but because the holders have been raised to the minimum wage. Some employees leave positions before their licences run out, and the latter are thus automatically cancelled. Each licence is issued for a particular individual, permitting her employment by a specified firm. The licensee, therefore, may not use her unexpired licence under any other than the original employer designated. Should a licence-holder desire to work for the remainder of her period with another firm in the same industry or occupation, a new licence may be obtained for the residue of her learning term upon application to the Board.

For the purposes of reference a brief summary of the Orders now in effect is here given:—

Mercantile Industry.

This includes all establishments operated for the purpose of trade in the purchase or sale of any goods or merchandise, and includes the work of all female employees engaged therein on the sales force; the wrapping force; the auditing or check-inspection force; the shoppers' force in the mail-order department; the receiving, marking, and stock-room employees; sheet-music saleswomen; and those otherwise engaged in the sale, purchase, or distribution of any goods or merchandise.

Minimum Wage.—Experienced workers 18 years of age or over: A weekly wage of not less than $12.75 for a week of 48 hours, and 26 9/16 cents per hour for additional work.

Girls under 18 years of age: A weekly wage of not less than $7.50 for first three months, $8 for second three months, $8.50 for third three months, $9 for fourth three months, $9.50 for fifth three months, $10 for sixth three months, $10.50 for seventh three months, $11 for eighth three months, and $12.75 thereafter.

Apprentices over 18 years of age: A weekly wage of not less than $9 for first three months, $10 for second three months, $11 for third three months, $12 for fourth three months, and $12.75 thereafter.

Licences required in this class. Application forms supplied.

Laundry, Cleaning, and Dyeing Industries.

Minimum Wage.—Experienced workers 18 years of age or over: A weekly wage of not less than $13.50 a week of 48 hours.

Girls under 18 years of age: A weekly wage of not less than $8 for first four months, $8.50 for second four months, $9 for third four months, $10 for fourth four months, $11 for fifth four months, $12 for sixth four months, and $13.50 thereafter.

Apprentices over 18 years of age: A weekly wage of not less than $9 for the first four months, $10.50 for second four months, $12 for third four months, and $13.50 thereafter.

Licences required in this class. Application forms supplied.

Public Housekeeping Occupation.

This includes the work of waitresses, attendants, housekeepers, janitresses, cooks, and kitchen help in restaurants, hotels, tea-rooms, ice-cream parlours, light-lunch stands, and other places where food is cooked, prepared, and served for which a charge is made; and the work of chambermaids in hotels, lodging-houses, and apartments where lodging is furnished, whether or not such establishments are operated independently or in connection with any other business; and the work of all female elevator operators.

Minimum Wage.—Experienced workers 18 years of age or over: A weekly wage of not less than $14 for a week of 48 hours.

Girls under 18 years of age: A weekly wage of not less than $12 until girl is 18 years of age and $14 thereafter.

Apprentices over 18 years of age: No apprenticeship deemed to exist in this occupation Licences may be issued at the discretion of the Board to the physically defective.

NOTE.—In emergency cases 52 hours a week may be worked. Time and one-half shall be paid for work in excess of 48 hours and up to 52 hours. When lodging is furnished, not more than $3 a week may be deducted for such lodging. When board or meals are furnished, not more than $5.25 a week may be deducted for a full week's board of 21 meals. A fraction of a week's board shall be computed upon a proportional basis. As elevator operators are required by law to pass an examination before running elevators, no apprenticeship is permitted under the Minimum Wage Order.

Office Occupation.

This includes the work of females employed as stenographers, book-keepers, typists, billing clerks, filing clerks, cashiers, cash-girls (not included in other Orders), checkers, invoicers, comptometer operators, auditors, attendants in physicians' and dentists' offices, and all kinds of clerical help.

Minimum Wage.—Experienced workers 18 years of age or over: A weekly wage of not less than $15 for a week of 48 hours.

Girls under 18 years of age: A weekly wage of not less than $11 for first six months, $12 for second six months, $13 for third six months, $14 for fourth six months, and $15 thereafter.

Apprentices over 18 years of age: A weekly wage of not less than $11 for first three months, $12 for second three months, $13 for third three months, $14 for fourth three months, and $15 thereafter.

Licences required in this class. Application forms supplied.

Manufacturing Industry.

This includes the work of females engaged in the making, preparing, altering, repairing, ornamenting, printing, finishing, packing, assembling the parts of, and adapting for use or sale any article or commodity, but excepting fish, fruit, and vegetable drying, canning, preserving, or packing.

Minimum Wage.—Experienced workers 18 years of age or over: A weekly wage of not less than $14 for a week of 48 hours.

Personal Service Occupation.

This includes the work of females employed in manicuring, hairdressing, barbering, and other work of like nature, or employed as attendants at shooting-galleries and other public places of amusement, garages, and gasolene service stations, or as drivers of motor-cars and other vehicles.

Minimum Wage.—Experienced workers 18 years of age or over: A weekly wage of not less than $14.25 for a week of 48 hours.

Girls under 18 years of age: A weekly wage of not less than $10 for first six months, $11 for second six months, $12 for third six months, $13 for fourth six months, and $14.25 thereafter.

Apprentices over 18 years of age: No apprenticeship for attendants at shooting-galleries and other public places of amusement, garages and gasolene service stations, or for drivers of motor-cars or other vehicles. For remaining classes a weekly wage of not less than $10 for first three months, $11 for second three months, $12 for third three months, $13 for fourth three months, and $14.25 thereafter.

Licences required in this class. Application forms supplied.

Ushers in theatres, music-halls, concert-rooms, lecture-halls, or the like—Ushers engaged after 6 p.m., on legal holidays, and for special matinees: A wage of not less than 30 cents an hour, with a minimum payment of 75 cents.

Ushers working more than 18 hours a week but not in excess of 36 hours a week: A weekly wage of not less than $10.80. (Ushers in this category may be employed only between the hours of 1.30 p.m. and 11 p.m.)

Ushers working in excess of 36 hours a week up to 48 hours a week: A weekly wage of not less than $14.25.

NOTE.—No distinction in wages to be made for ushers under 18 and over 18 years of age. No apprenticeship considered necessary for ushers.

Telephone and Telegraph Occupation.

This includes the work of all persons employed in connection with the operating of the various instruments, switchboards, and other mechanical appliances used in connection with telephony and telegraphy, and shall also include the work of all persons employed in the business or industry of the operation of the telephone or telegraph systems who are not governed by any other Order of the Board.

Minimum Wage.—Experienced workers: A weekly wage of not less than $15 for a week of 48 hours.

Inexperienced workers: A weekly wage of not less than $11 for first three months, $12 for second three months, $13 for third three months, and $15 thereafter.

NOTE.—Except as hereinafter mentioned, the maximum hours of labour shall be not more than 8 hours in any one day nor more than 48 hours in any one week, and every employee shall have one

full day off duty in every week. Where telephone and telegraph employees are customarily on duty between the hours of 10 p.m. and 8 a.m., 10 hours on duty shall be construed as the equivalent of 8 hours of work in computing the number of hours of employment a week. In cases where employees reside on the employer's premises, the employer shall not be prevented from making an arrangement with such employees to answer emergency calls between the hours of 10 p.m. and 8 a.m. In cases of emergency 56 hours a week may be worked. Time and one-half shall be paid for work in excess of 48 hours and up to 56 hours. The total number of inexperienced female employees shall not exceed 35 per cent. of the total number of females employed in any plant or establishment.

Fishing Industry.

This includes the work of females engaged in the washing, preparing, preserving, drying, curing, smoking, packing, or otherwise adapting for sale or use, or for shipment, any kind of fish, except in the case of canned fish.

Minimum Wage.—Experienced workers of any age: A weekly wage of not less than $15.50.

Inexperienced workers of any age: A weekly wage of not less than $12.75 for the first four months, $13.75 for second four months, $14.75 for third four months, and $15.50 thereafter.

Fruit and Vegetable Industry.

This includes the work of females engaged in canning, preserving, drying, packing, or otherwise adapting for sale or use, any kind of fruit or vegetable.

Minimum Wage.—Experienced workers of any age: Not less than $14 a week of 48 hours; for work over 48 hours but not in excess of 60, not less than 30 cents an hour; for work in excess of 60 hours a week, not less than 45 cents an hour.

Inexperienced workers of any age: A weekly wage of not less than $10 for week of 48 hours for first month, $11 for week of 48 hours for second month, and $12 for week of 48 hours for third month.

NOTE.—Overtime work for inexperienced employees to be paid in same proportion to their wages as overtime payment for experienced employees. Work in excess of 48 hours a week allowed only during an emergency period of 90 days in any 12 months, or if the Board finds unusual conditions necessitate a longer period, it may, in its discretion, extend such emergency period.

STATISTICAL REPORT.

In order to make a comparison with rates of wages, working-hours, and conditions of labour with those existing last year and the year before, forms were mailed to every employer in the Province, requesting the following information: Name of all female employees, together with their residence addresses; occupation; weekly wage-rate; hours worked for a specified week; actual money received that week; whether the employee was over or under 18 years of age, and length of service with employer reporting. In addition to the information which had been asked for in previous years, employers were requested this year to state the length of time each employee had been in their service, and also to furnish the residence address of every employee. The information obtained from these returns has been classified and tabulated under nine heads, corresponding to the groups of occupations, trades, or callings covered by the existing Orders of the Board. In all, forms were returned by 1,923 employers relating to 9,722 female employees. The tables are herewith appended:—

MERCANTILE INDUSTRY.

	1921.	1920.	1919.
Number of firms reporting	278	317	121
Number of employees—			
Over 18 years	1,788	1,685	1,428
Under 18 years	256	369	323
Total weekly wages—			
Employees over 18 years	$28,601.35	$26,852.90	$20,951.25
Employees under 18 years	$2,389.50	$3,528.00	$3,144.25
Average weekly wages—			
Employees over 18 years	$15.99	$15.94	$14.67
Employees under 18 years	$9.33	$9.56	$9.73
Percentage of employees under 18 years	12.52%	17.96%	18.5%
Average hours worked per week	44.17	43.7	46.1

The total number of employees reported in this occupation is 2,044. The legal minimum wage set was $12.75 for a 48-hour week. The foregoing table shows the average weekly wage to have risen 5 cents per week during the year for experienced women over 18 years of age, and to have dropped 23 cents per week for those under 18. The percentage of employees under 18 has

decreased 5.44 per cent. The average hours show a small increase. This may be accounted for by the fact that one or two large establishments have slightly lengthened their hours, though still coming within the 48-hour week.

Thirty-nine more firms sent in returns in 1920 than in 1921, but there are more employees over 18 years of age working for the lesser number of firms. The peak for wages is between $15 and $16 per week. The peak for weekly hours is between 44 and 44½, 828 working the former and 411 the latter number of hours. There apparently were fewer short or part-time workers in 1921 than in 1920.

The longest term of service reported in this occupation is 20 years. Three instances of this length of employment were reported in one establishment in Victoria. The highest wage given is $67.30 per week.

LAUNDRY INDUSTRY.

	1921.	1920.	1919.
Number of firms reporting	33	35	23
Number of employees—			
Over 18 years	449	486	361
Under 18 years	70	84	75
Total weekly wages—			
Employees over 18 years	$6,478.50	$7,332.00	$5,229.50
Employees under 18 years	$837.00	$1,004.00	$839.50
Average weekly wages—			
Employees over 18 years	$14.43	$15.08	$14.48
Employees under 18 years	$11.96	$11.95	$11.19
Percentage of employees under 18 years	13.49%	14.74%	17%
Average hours worked per week	44.74	45.72	45.1

The total number of employees reported in this industry is 519. The legal minimum wage was set at $13.50 per week for experienced women 18 years of age or over for 48 hours. The average weekly wage is shown at $14.43, a decrease of 65 cents per week since 1920. This is partially accounted for by the shorter hours. While there is an increase of 1 cent per week for workers under 18, there is a decrease of 1.25 per cent. in the number of this age employed. The average hours are shorter by 0.98 per week.

The peak for wages is reached at between $13 and $14 per week, 105 women over 18 and 12 of the younger workers coming within this division. The peak for hours is 48. This industry, coming within the scope of the "Factories Act," is limited as to hours by that Statute. The longest term of service recorded is 15 years and the highest weekly wage $25.

PUBLIC HOUSEKEEPING OCCUPATION.

	1921.	1920.	1919.
Number of firms reporting	242	244	97
Number of employees—			
Over 18 years	994	1,184	652
Under 18 years	26	58	43
Total weekly wages—			
Employees over 18 years	$15,774.06	$19,625.44	$10,568.00
Employees under 18 years	$373.00	$913.50	$612.50
Average weekly wages—			
Employees over 18 years	$15.87	$16.58	$16.20
Employees under 18 years	$14.35	$15.75	$14.24
Percentage of employees under 18 years	2.55%	4.67%	6%
Average hours worked per week	45.26	46.51	48.95

The total number of employees accounted for is 1,020. The legal minimum wage for experienced women 18 years of age or over is $14 per 48-hour week. The average weekly wage is $15.87, a decrease of 71 cents per week since 1920. For those under 18 years of age the weekly average is $14.35, a decrease of $1.40 per 48-hour week. There is a decrease of 2.12 per cent. of employees under 18 years of age. The peak for wages is between $15 and $16 for employees both over and under 18 years of age. Of these, 284 receive this wage, while 253 appear between $14 and $15. But 2.55 per cent. of employees in the public housekeeping occupation are reported as under 18 years old. This does not include private domestic service or servants, who are exempt under the Act, and over whose wages or hours the Board has no jurisdiction.

In this occupation employers may, in emergency cases, exceed the 48-hour weekly limit by 4 additional hours in a week, but time and one-half is paid for the extra hours. Where board and lodging is furnished, it is estimated at the following figures, as prescribed by the Board: $3 a week for room and $5.25 for full board of 21 meals a week.

The peak for hours is reached at 48 a week, 479 employees working these hours, while 107 work the shorter week of 44 hours. The highest wage reported in this occupation is $35 a week. The longest term of service with the same employer is 18 years.

OFFICE OCCUPATION.

	1921.	1920.	1919.
Number of firms reporting	1,043	1,019	220
Number of employees—			
Over 18 years	2,434	2,467	750
Under 18 years	50	155	60
Total weekly wages—			
Employees over 18 years	$47,155.97	$47,941.00	$13,683.00
Employees under 18 years	$577.00	$2,110.00	$804.00
Average weekly wages—			
Employees over 18 years	$19.37	$19.43	$18.24
Employees under 18 years	$11.54	$13.61	$13.40
Percentage of employees under 18 years	2.01%	5.9%	7%
Average hours worked per week	40.89	41.5	43.6

TABLE SHOWING NUMBER OF EMPLOYEES RECEIVING WAGES OF $25 OR MORE PER WEEK.

Weekly Wages.	Number of Employees.	Weekly Wages.	Number of Employees.
$25.00 to $25.99	98	$35.00 to $35.99	9
26.00 " 26.99	30	36.00 " 36.99	3
27.00 " 27.99	24	37.00 " 37.99	3
28.00 " 28.99	35	38.00 " 38.99	2
29.00 " 29.99	3	40.00 " 40.99	4
30.00 " 30.99	26	43.00 " 43.99	3
31.00 " 31.99	11	46.00 " 46.99	4
32.00 " 32.99	3	50.00 or over	1
33.00 " 33.99	1	Total	275
34.00 " 34.99	15		

The total number of women employed, according to returns, is 2,484. The legal minimum wage for experienced women 18 years of age or over is $15 for a 48-hour week.

This occupation shows the highest rewards for the greatest number of employees, and the greatest number with long service with the same employers. The average weekly wage is $19.37, a decrease of 6 cents per week since 1920. There is a decrease of 3.89 per cent. in the employment of those under 18 years of age, only 50 of the younger workers being reported, thus indicating that a greater number receive the higher wage required for those over 18 years of age. The average for hours is 40.89 weekly, a decrease of 0.61 hour per week since 1920. The peak for wages is between $15 and $16, 398 women coming within this class and 314 receiving from $20 to $21 per week. The peak for hours is 44 a week, and 753 women work these hours. For 39 hours 444 work; for 42 hours the number given is 263; and for the 48-hour week 198 women. The highest wage stated is $50 a week. The longest term of service with the same firm or company is 28 years. A company in Vancouver which employs a large office staff shows the following record of continuous service: 3 women office employees are reported as having served them 10 years, 1 for 14 years, 2 for 15 years, 1 for 17 years, and 1 for 19 years.

It might be gathered from the trend of comment offered by employers in the space provided on the back of the forms for the purpose of remark that some of them apparently hold the opinion that inexperienced girls will have great difficulty in securing positions, while at the same time they declare it is hard to get experienced help. If such be the case, it surely follows that when vacancies occur it will be necessary to use the assistance available, and the supply must presumably be drawn from the young women whose courses in commercial schools have just been completed.

MANUFACTURING INDUSTRY.

	1921.	1920.	1919.
Number of firms reporting	199	181	127
Number of employees—			
Over 18 years	1,145	989	837
Under 18 years	298	201	264
Total weekly wages—			
Employees over 18 years	$18,323.42	$16,454.96	$12,694.00
Employees under 18 years	$2,939.00	$2,087.00	$2,939.00
Average weekly wages—			
Employees over 18 years	$16.00	$16.64	$15.13
Employees under 18 years	$9.86	$10.38	$11.13
Percentage of employees under 18 years	20.65%	16.89%	23.93%
Average hours worked per week	42.63	43.8	45.9

The total number of women and girls employed, according to the returns, is 1,443. The legal minimum for experienced women 18 years of age or over is $14 for a 48-hour week. The average weekly wage for experienced workers over 18 is $16. This is a decrease of 64 cents per week since 1920, but is still $2 per week higher than the minimum. There is a slight increase in the employment of those under 18 years of age—namely, 3.74 per cent. The average for hours is 42.63 a week, being a decrease of 1.17 since 1920. The peak for wages is between $14 and $15 for women over 18 years of age. The peak for hours occurs at 44 a week, 634 women working these hours, while 212 work 48 hours, the limit set under the "Factories Act." The highest wage shown is $44 per week. It is interesting to note that 55 women receive between $25 and $44 a week in this industry. The longest term of service with one firm or company is 10 years.

It is gratifying to note the returns from 18 more firms than in 1920, and that there is an apparent increase in the total number of women employees. There is, however, an increase also in the number working short hours or part time—49 women working 24 hours or less per week, as against 27 in 1920. The Board has no stated Order regarding part-time workers, as it has been legally advised that no authority may require an employer to pay for hours during which the employee is neither working nor on duty. Part time under British Common Law is paid for on the basis of the time actually worked.

PERSONAL SERVICE OCCUPATION.

	1921.	1920.
Number of firms reporting	22	37
Number of employees—		
Over 18 years	69	144
Under 18 years	18	17
Total weekly wages—		
Employees over 18 years	$1,077.50	$2,403.25
Employees under 18 years	$203.00	$246.00
Average weekly wages—		
Employees over 18 years	$15.62	$16.69
Employees under 18 years	$11.28	$14.47
Percentage of employees under 18 years	20.06%	10.56%
Average hours worked per week	38.52	35.7

The total number of female employees reported is 87. As some of the establishments coming under this classification operate "schools," there are women and girls engaged in this occupation who are not indicated on the pay-rolls. The legal minimum wage for experienced women is $14.25. The average weekly wage for women 18 years of age or over is $15.62, a decrease of $1.07 per week since 1920. There is an increase of 9.5 per cent. in the number of girls employed who are under 18 years old. The peak of wages is between $15 and $16, and the peak for hours is 48 per week, 32 employees working these hours. The average hours show an increase from 35.7 a week in 1920 to 38.52 a week in 1921.

The highest wage reported is $35 a week and the longest term of employment with the same firm is 11 years. Under this Order theatre ushers are included, and the short hours worked by them have the effect of bringing down the general average.

TELEPHONE AND TELEGRAPH OCCUPATION.

	1921.	1920.
Number of firms reporting	69	71
Number of employees—		
Experienced	988	848
Inexperienced	158	379
Total weekly wages—		
Experienced employees	$15,986.37	$14,528.00
Inexperienced employees	$2,113.50	$4,778.50
Average weekly wages—		
Experienced employees	$16.18	$17.13
Inexperienced employees	$13.38	$13.90
Percentage of inexperienced employees	13.8 %	30.88%
Average hours worked per week	41.7	42

The total number of employees reported in this occupation is 1,146. The legal minimum wage for experienced employees is $15 for a 48-hour week. In emergency cases only the time may be extended to 56 hours per week, the excess to be paid for at the rate of one and one-half times the regular wage. The average weekly wage for experienced women is $16.18, a decrease of 95 cents per week since 1920, and for the inexperienced the average per week is $13.38, a decrease of 52 cents weekly, partly accounted for by a slight decrease in hours. As there is a decrease of 17.08 per cent. of inexperienced women employed, a greater number are receiving the higher wage. This Order sets the wage according to experience and regardless of the age of the employee.

The average number of hours worked is 41.7 a week. In many cases there is a 7-hour day and fairly short shifts. The peak for weekly wages for experienced women is between $15 and $16. The peak for hours is 44 a week, while more than half the number reported work between 42 and 44 hours a week. The hours in general show a slight decrease. The highest wage recorded is $35 a week. The longest term of service with one employer is 16 years. Another employee is credited with 15 years' service, 4 with 13 years, 1 with 12 years, and 8 with 11 years.

FISHING INDUSTRY.

	1921.	1920.
Number of firms reporting	12	9
Number of employees—		
Experienced	36	24
Inexperienced	12	1
Total weekly wages—		
Experienced employees	$534.00	$433.19
Inexperienced employees	$143 50	$9.50
Average weekly wages—		
Experienced employees	$14.81	$13.05
Inexperienced employees	$11.96	$9.50
Percentage of inexperienced employees	25%	25%
Average hours worked per week	41.5	49.36

The total number of female employees reported is 48. Four more firms sent in returns this year than in 1920, with a slightly increased corresponding number of employees. The legal minimum wage for experienced women is $15.50 for a 48-hour week. This is the highest minimum wage set so far in British Columbia. The industry calls for skill and experience and the conditions are somewhat trying. The wages, however, are good and the supply of experienced female workers limited. Originally this industry was carried on by experienced Old Country women, but Canadian girls and women are gradually taking it up.

This Order is based on experience or inexperience, not on age. The average weekly wage is $14.81, due to short hours, the season of 1921 not being a very active one. There was a decrease in the number of inexperienced workers employed and an increase in the number of trained workers; therefore a greater number receiving the higher rate. The peak for wages is between $18 and $19 a week for experienced employees. The peak for hours is 48. The average hours worked per week are 7.86 less than in 1920, probably due to a less busy season.

The highest wage reported is $24 a week and the longest term of service with the same employer is 12 years.

Fruit and Vegetable Industry.

	1921.		1920.
Number of firms reporting	25		26
	Time-workers.	Piece-workers.	
Number of employees—			
Experienced	509	180	654
Inexperienced	145	97	64
Total weekly wages—			
Experienced employees	$8,841.69	$4,311.82	$11,676.27
Inexperienced employees	$1,234.60	.....	$762.00
Average weekly wages—			
Experienced employees	$17.37	$23 95	$17.85
Inexperienced employees	$8.51	$8 87	$11.90
Percentage of inexperienced employees	25.9%		8.91
Average hours worked per week (time-workers)	46.75		48.45

The legal minimum wage in this industry is at the rate of $14 for a 48-hour week and an 8-hour day, with a slight increase in wages for the first 2 hours after the 8 hours and a greater increase for hours exceeding 10 per day. This industry being subject to "rush" conditions during the height of the season, there is no restriction as to the length of overtime which may be worked during a period limited to 90 days in a year. Special rates for overtime must be paid in all such cases. The figures tabulated are for the employer's week of greatest employment. The work is very seasonal.

The average weekly wage reported is $17.37 for time-workers and $23.95 for piece-workers. The average hours worked are 46.75 per week, piece-workers not being included. The peak of wages occurs between $14 and $15 per week, 107 women and girls coming within this class. Time-workers and piece-workers to the number of 70, who are experienced, are reported in the returns as receiving $25 a week or over. The peak for hours is reached at 48 a week. This includes 140 time-workers, but not any piece-workers. The highest wage indicated is $52.15 in one week.

Length of Service.

Some interesting data were gathered during 1921 relative to the length of service of employees in the various occupations, trades, or callings covered by Orders of the Board. A column was provided on the returns sent out to each employer in the Province requesting him to state the length of time each individual female employee had been in his service. The information thus gathered has been tabulated for reference and is worthy of careful study.

In connection with the figures in the fruit and vegetable industry, it must be remembered that most of the establishments operate for a short time each year, and for this reason practically all the employees are reported as having served the employer for a period "under 1 year." Nevertheless, a great many of these workers have been engaged in the industry season after season.

The figures for the office-workers show this to be a more permanent and steady occupation than any of the other groups. Better prospects in the way of increased salaries for long service have probably induced office-workers to remain with their employers for long terms, thus lessening the labour turnover in this calling.

It will be noted that 3,817 employees, or 39.2 per cent. of all those reported, have been with the firm sending in the return for less than 1 year. But 225 employees out of the 9,722 employed are recorded as having served 10 years or over. This long-service credit accounts for 2.3 per cent.

Table showing Labour Turnover in each Group—Number of Employees in Continuous Service of Employer reporting.

Name of Industry.	Not specified.	Under 1 Year.	1 to 2 Years.	2 to 3 Years.	3 to 4 Years.	4 to 5 Years.	5 to 6 Years.	6 to 7 Years.	7 to 8 Years.	8 to 9 Years.	9 to 10 Years.	10 Yrs. or over.	Number of Employees reported.	Number of Firms reporting.
Mercantile	79	854	457	236	169	86	51	21	18	13	23	37	2,044	278
Laundry	91	153	111	67	40	26	7	5	3	5	5	6	519	33
Public housekeeping	53	520	194	116	56	32	18	8	9	4	4	6	1,020	242
Office	143	549	528	376	305	196	118	50	26	39	35	119	2,484	1,043
Manufacturing	11	656	215	222	140	62	46	27	9	22	9	24	1,443	199
Personal service	..	46	16	11	6	3	1	1	2	..	..	1	87	22
Telephone and telegraph	5	192	413	204	100	91	40	11	12	25	22	31	1,146	69
Fishing	16	22	7	1	1	..	..	..	..	..	..	1	48	12
Fruit and vegetable	74	825	3	15	8	3	2	1	..	..	..	..	931	25
Totals	472	3,817	1,944	1,248	825	499	283	124	79	108	98	225	9,722	1,943

WAGES SHOW A BETTER BALANCE.

No one can study the returns made to the Board without remarking the general improvement shown in hours of employment and the greater numbers receiving the higher wages. While here and there girls may have lost their positions because employers did not consider them worth the legal minimum wage, the returns show a better balance in wages of the whole body of women workers in British Columbia than in former years. More employees are passing up into the better-paid classifications. For example, in the mercantile industry the returns indicate that adult women receiving the highest salaries ($25 a week or over) number more than twice as many in 1921 as in 1920. The pay-rolls show no justification for the fear sometimes expressed that the setting of a legal minimum wage for adult workers would cause wholesale replacement by those under age.

LIKE PAY FOR LIKE WORK.

The question of married women and girls who work for pin-money is not as important as appears to be current belief, and any danger of abuses arising from this practice may be met by establishing the principle of equal pay for equal work. Few women would work full hours unless there were real need, and employers would not be likely to employ workers who display no real interest in their work, or who hold so slender a grasp upon their positions. Recent surveys indicate that the number of women working whose circumstances do not require them to take up outside work is negligible. It is important to note that the number of women and girl employees living away from their families in lodging and boarding houses is increasing as our cities grow in population.

UNEMPLOYMENT.

During the period of high wages the benefit of minimum-wage legislation and the protection given to fair employers was not so clearly realized as it is now, and will be in the immediate future. One of the great English statesmen asserted that world unemployment is greater now than it was after the Napoleonic wars, and that one-fourth of this unemployment was amongst women. Upon the recent opening of a large establishment in British Columbia for 400 places there were over 4,000 applicants, the majority of these being women.

COLLECTING ARREARS OF WAGES.

It is gratifying to report that the Board has been able to make many collections, several of considerable amounts, of arrears owing in cases where, either through misunderstanding or design, the full minimum wage had not been paid. While there is a steady increase in the number of adjustments between employers and employees, they are conducted with as little publicity as possible to either side. The effort of the Board is to adjust controversies concerning either hours or wages with the least friction, but with justice to both parties.

Unfortunately, often those publicly asserting they know of violations are the last either to inform the Board or to assist in any way in rectifying breaches of the Orders or the Statute of which they proclaim their knowledge. During the year inspection of pay-rolls and time-sheets evidenced some cases of violation of the Orders, and some complaints were made by employees. After verifying the cause of complaint the matter has been taken up with the employer. It is pleasing to record that adjustments are usually made promptly and with good grace. Two illustrations may be cited in passing. In Vancouver City the sum of $75 was collected by the Board for an employee who had been working for some time for a wage considerably below that prescribed by the Board. The $75 represents the difference between what the employee received and what she should have been paid according to the Order. A collection involving $326 has been made recently in Victoria for an employee who had been working at a wage much lower than the legal minimum for about two years. A factory employing an appreciable number of women workers was found to be in operation 54 hours a week. Upon this being brought to the attention of the manager the working-week was reduced at once to 48 hours.

This year several prosecutions for violations have been brought in the Courts. The first case failed on technical grounds, but the latter ones were successful.

Fixing Conditions of Employment.

In fixing upon definite restrictions for women and girls in hours, kind of work, and conditions of labour, careful consideration should be given, lest these employees should be so hampered as to close the door to their entry into certain occupations. It is necessary to seek means to preserve the proper balance in regulations that will prevent exploitation and lowering of health and vitality of actual or potential mothers, and yet to avoid the imposition of embarrassing restrictions upon them in securing well-paid work.

Welfare-work.

A pleasing phase in the industrial situation is the increasing number of companies and firms installing welfare-work among their employees. Many business houses and corporations are providing lunch or rest rooms, hot drinks, low-cost luncheons, medical care, clubs and recreation, summer camps, etc.

Amendments to Act.

At the session of the Legislature in the spring of 1921 certain amendments were made to the "Minimum Wage Act." Among these is a section limiting the number of employees holding special licences and girls under 18 years of age to 35 per cent. of the total number of female employees in any plant or establishment. While some Minimum Wage Boards or Industrial Welfare Commissions issue these restrictions as regulations, the British Columbia Board deemed it advisable to secure statutory provisions to this effect. A further amendment provides a learning or inexperience period in occupations in which there is no apprenticeship. By another amendment the publication of Orders in the British Columbia Gazette become not only conclusive evidence of such Orders, but of the legality of all steps leading up to them. This amendment should prove valuable in remote parts of the Province where cases are being brought in the Courts. Hitherto it was necessary to produce the original Order, which is hazardous and inexpedient, as documents may be lost that cannot be replaced.

Conclusion.

In conclusion, sir, it is with pleasure we are able to report a wider understanding of the purposes and aims of the Minimum Wage Law, and more sympathetic co-operation between the Board and both employers and employees, with an appreciably noticeable increase in welfare-work on the part of firms and corporations.

We have the honour to be,
Sir,
Your obedient servants,

J. D. McNiven, *Chairman.*
Helen Gregory MacGill.
Thomas Mathews.

APPENDIX TO REPORT OF MINIMUM WAGE BOARD.

CHANGES MADE SINCE THE CLOSE OF 1921.

Between the close of 1921 and the time of the present report going to press, two of the Orders under the "Minimum Wage Act" have been reviewed by the Board. While this does not come strictly within the purview of the 1921 report, it is felt that, in order to make the present position clear, a brief explanation should be given of these recent developments.

With reference to the position of inexperienced female workers in the manufacturing industries, it is mentioned in the report that a large number of meetings were held during 1921, but that at the close of that year a decision was still in abeyance.

On March 20th, 1922, the Board issued a notice tabulating certain schedules of wages which it is proposed to adopt. These schedules were as follows:—

SCHEDULE No. 1.

For all inexperienced female employees (not covered by Orders of the Board) employed in photographic studios, meat-packing, seed-packing, and tea-packing establishments, and in any business, trade, calling, or occupation in which any of the articles or commodities mentioned in the following list (and not enumerated in Schedules 2, 3, and 4) are manufactured, prepared, or adapted for use or sale, or in any business, trade, calling, or occupation ancillary or accessory to the said business, trade, calling, or occupation: Awnings, bags (cotton, jute, and paper), baking-powders, bedding, beds, bed-springs, buttons, cans, clothes-pins, coffee, corn brooms, cream and milk products, drug and toilet preparations, explosives, extracts, gas-mantles, honey, ink, jelly-powders, macaroni, matches, mattresses, men's neckwear, molasses, munitions, overalls, pails, paint, peanut butter, roofing, sauces, shirts, soap, soft drinks, spices, sugar, sweeping compounds, syrups, tents, toys, umbrellas, varnish, vermicelli, washboards, water-proof clothing, whisks, window-shades, and yeast; the wages proposed for the above-mentioned group are as follows:—

(*a.*) For inexperienced women 18 years of age or over—
Not less than $8 a week for the first month's employment in the occupation.
Not less than $10 a week for the second month's employment in the occupation.
Not less than $12 a week for the third month's employment in the occupation.
Not less than $14 a week thereafter.

(*b.*) For inexperienced girls under 18 years of age—
Not less than $8 a week for the first two months' employment in the occupation.
Not less than $10 a week for the second two months' employment in the occupation.
Not less than $12 a week for the third two months' employment in the occupation.
Not less than $14 a week thereafter.

SCHEDULE No. 2.

For all inexperienced female employees (not covered by Orders of the Board) employed in any business, trade, calling, or occupation in which any of the articles or commodities mentioned in the following list (and not enumerated in Schedules 1, 3, and 4) are manufactured, prepared, or adapted for use or sale, or in any business, trade, calling, or occupation ancillary or accessory to the said business, trade, calling, or occupation: Biscuits, brushes, candy (except dipped chocolates), caps, carpets, cigars (machine-made), elastic goods, furniture, gloves, hats (other than millinery), hosiery, ladies' and children's wear, leather goods, regalia, and rugs; the wages proposed for the above-mentioned group are as follows:—

(*a.*) For inexperienced women 18 years of age or over—
Not less than $8 a week for the first two months' employment in the occupation.
Not less than $10 a week for the second two months' employment in the occupation.
Not less than $12 a week for the third two months' employment in the occupation.
Not less than $14 a week thereafter.

(*b.*) For inexperienced girls under 18 years of age—
Not less than $8 a week for the first three months' employment in the occupation.
Not less than $10 a week for the second three months' employment in the occupation.
Not less than $12 a week for the third three months' employment in the occupation.
Not less than $14 a week thereafter.

SCHEDULE No. 3.

For all inexperienced female employees (not covered by Orders of the Board) employed in knitting-factories, and in any business, trade, calling, or occupation in which any of the articles or commodities

mentioned in the following list (and not enumerated in Schedules 1, 2, and 4) are manufactured, prepared, or adapted for use or sale, or in any business, trade, calling, or occupation ancillary or accessory to the said business, trade, calling, or occupation: Boots and shoes, dipped chocolates, draperies, furniture-covering, men's ready-to-wear clothing, and paper boxes; the wages proposed for the above-mentioned group are as follows:—

(*a.*) For inexperienced women 18 years of age or over—
Not less than $8 a week for the first three months' employment in the occupation.
Not less than $10 a week for the second three months' employment in the occupation.
Not less than $12 a week for the third three months' employment in the occupation.
Not less than $14 a week thereafter.

(*b.*) For inexperienced girls under 18 years of age—
Not less than $8 a week for the first four months' employment in the occupation.
Not less than $10 a week for the second four months' employment in the occupation.
Not less than $12 a week for the third four months' employment in the occupation.
Not less than $14 a week thereafter.

SCHEDULE NO. 4.

For all inexperienced female employees (not covered by Orders of the Board) employed in any of the following businesses, trades, callings, or occupations (and not enumerated in Schedules 1, 2, and 3), or in any business, trade, calling, or occupation ancillary or accessory to the said business, trade, calling, or occupation: Bookbinding, cigar-manufacturing (hand-made), custom tailoring, dressmaking, embossing, engraving, fur-manufacturing, garment-alteration, jewellery-manufacturing, millinery, and printing; the wages proposed for the above-mentioned group are as follows:—

(*a.*) For inexperienced women 18 years of age or over—
Not less than $8 a week for the first four months' employment in the occupation.
Not less than $10 a week for the second four months' employment in the occupation.
Not less than $12 a week for the third four months' employment in the occupation.
Not less than $14 a week thereafter.

(*b.*) For inexperienced girls under 18 years of age—
Not less than $8 a week for the first six months' employment in the occupation.
Not less than $10 a week for the second six months' employment in the occupation.
Not less than $12 a week for the third six months' employment in the occupation.
Not less than $14 a week thereafter.

NOTE.—Where the amounts earned at piece-work rates are less than the amounts mentioned in Schedules 1, 2, 3, and 4 respectively, nevertheless the employees shall be paid not less than the rates set forth in the above schedules respectively.

The schedules do not include those trades and crafts in which indentured apprenticeship is still customary. The Board, therefore, had it in mind that "In any occupation in which apprentices are usually employed . . . and in cases where the Board is satisfied that the application therefor is made in good faith . . . the Board may issue . . . a special licence . . . authorizing employment in that occupation, trade, or industry at a wage . . . to be fixed in the licence less than the minimum wage fixed for that occupation."

The Board reserved the right to accept as satisfactory or vice versa each indenture as submitted before issuing such licence. Employers and employees in such trades as bookbinding, jewellery, dressmaking, printing, millinery, etc., where there is a *bona-fide* intention to teach the whole trade and to accept indentured apprentices, would come under the limitations of section 10, subsection (4). This, in the opinion of the Board, is only just and equitable to both parties.

Up to the time these schedules were suggested little interest had been evinced in the efforts of the Board to arrive at an equitable and just decision. Their publication was followed by public meetings in Victoria on April 5th, 1922, and in Vancouver on April 6th, 1922. At the Victoria meeting the views of both employers and employees were presented; but at Vancouver, while the employees were fairly well represented, unfortunately the delegation representing the manufacturing interests took the view that they would not take part or assist in any way unless the Board immediately desisted from this discussion to reopen the whole wage question, both for experienced and inexperienced workers.

The Chairman pointed out that this was impossible, and that a re-opening of the Order could only be taken up again legally after the conditions had been complied with as set forth in section 9 of the Act. He further explained that if there were any change in the legal minimum for experienced workers the schedules would be modified in accordance with the same. In this position he was unanimously supported by the other two members.

Since then the employers in the manufacturing industry have complied with the Act and presented the necessary petition, and the whole matter is ready for reopening at the discretion of the Board.

The question of revising the minimum wage in the fruit and vegetable industry was taken up at a later date; and after some amount of preliminary inquiry, public meetings were held at Kelowna on May 26th, 1922, and at Vancouver on May 29th, 1922.

The reopening of the question was in accordance with section 9 of the "Minimum Wage Act," upon petition from employers. The Board sent out and distributed great numbers of cost-of-living forms to employers, employees, and the general public all over the Province, with particular reference to those sections most deeply concerned in this industry. Returns from all classes, including housekeepers, appeared to indicate plainly that, while there were noticeable fluctuations in prices, there has been no appreciable lowering of essential items, such as to affect definitely the cost of living for a self-supporting woman without other resources. The evidence showed that experienced girls and women obliged to live upon their earnings could not do so upon less than $14 a week. It is noteworthy that, whereas the cost-of-living returns in 1918 averaged $15.57, the returns in 1921 worked out to $16.97, an apparent difference in favour of a higher wage.

The benefit to be derived from personal contact and considered discussion as between employers and employees at times when there is no strife was again evident. It was gratifying upon these occasions, as before, to note the gradual growth of mutual understanding of each other's difficulties and the developing spirit of give-and-take between the two classes. When the final decision was reached to recommend a continuance of the $14 weekly minimum, both sides had made concessions and compromises.

The Board has since met and approved the recommendations; the new Order being the same practically as the former one, the rates remaining as before.

CHAPTER 56.

AN ACT TO FIX A MINIMUM WAGE FOR WOMEN.

[Consolidated for convenience only, April 4th, 1921.]

HIS MAJESTY, by and with the advice and consent of the Legislative Assembly of the Province of British Columbia, enacts as follows:—

Short title.

1. This Act may be cited as the "Minimum Wage Act."

Interpretation.

2. In this Act the following expressions shall have the following meanings respectively:—

The term "employer" shall include every person, firm, or corporation, agent, manager, representative, contractor, sub-contractor, or principal, or other persons having control or direction of any employee in any trade, business, occupation, or calling, or responsible directly or indirectly for the wages of another:

The term "employee" shall include every female person who is in receipt of or entitled to any compensation for labour or services performed for any employer:

The terms "wage" and "wages" shall include any compensation for labour or services, measured by time, piece, or otherwise:

The term "minimum wage" shall mean the amount of wages fixed by the Board:

The term "Board" shall mean the Minimum Wage Board constituted under the provisions of this Act.

Minimum Wage Board constituted.

3. For the purposes of administering and carrying out the provisions of this Act, there shall be in the Department of Labour of this Province a Board, to be called the "Minimum Wage Board," which shall consist of three members, one of whom shall be the Deputy Minister of Labour, who shall be Chairman of the Board, and the other members shall be appointed by and hold office during the pleasure of the Lieutenant-Governor in Council. One member of the Board shall be a woman. Two members of the Board shall constitute a quorum.

Provision for staff and expenses.

4. No member of the Board shall receive any salary as such. The Board may employ a secretary and such expert clerical and other assistants as may be necessary to carry out the purposes of this Act, who shall hold office during the pleasure of the Lieutenant-Governor in Council. All necessary expenses incurred by said Board shall be paid by the Department of Labour from the Consolidated Revenue Fund unless moneys have been appropriated by the Legislature for that purpose.

Duties and powers of Board.

5. It shall be the duty of the Board to ascertain the wages paid and the hours and conditions of labour and employment in the various occupations, trades, and industries in which females are employed in this Province, and to fix the minimum wage, the maximum hours, and such conditions of labour and employment as in the opinion of the Board seem necessary or expedient for the welfare of employees. The Board shall have full power and authority, either by any member of the Board or by any duly authorized representative, to inspect and examine any and all books, pay-rolls, and other records of any employer that in any way appertain to or have any bearing upon the question of wages, hours, or conditions of labour and employment of any employees, and to take extracts from or make copies of any entries in such books, pay-rolls, and records, and to require from any employer full and true statements of the wages paid to his employees and the hours and conditions of labour and employment of such employees. A register of the names, ages, and residence addresses of all employees shall be kept by employers.

Power to hold public meetings and inquiries.

6. The Board may from time to time hold public meetings at a time and place to be fixed by them, at which employers and employees and all persons interested may appear and be heard. For the purpose of obtaining information, the Board shall have the powers and authorities conferred by the "Public Inquiries Act" on a Commission issued or appointed by the Lieutenant-Governor in Council, and the provisions of that Act shall, mutatis mutandis, extend and apply to any inquiry held by the Board under this Act. All witnesses subpœnaed by the Board shall be paid the same witness fees and mileage as are now allowed by law to witnesses before the Supreme Court of British Columbia.

Conference to consider and recommend minimum wage and maximum hours of labour.

7. If, after investigation, the Board shall find that in any occupation, trade, or industry the wages paid to employees are inadequate or the hours of labour are excessive, the Board is empowered to call a conference composed of an equal number of representatives of employers and employees in the occupation or industry in question, together with one or more disinterested persons representing the public; but the representatives of the public shall not exceed the number of representatives of either of the other parties; and a member of the Board shall be a member of such conference and chairman thereof. The Board may make rules and regulations governing the selection of representatives and the mode of procedure of said conference, and shall exercise exclusive jurisdiction over all questions arising as to the validity of the procedure and of the recommendations of said conference. On request of the Board, it shall be the duty of the conference to recommend to the Board an estimate of the minimum wage proper in the occupation or industry in question, and adequate to supply the necessary cost of living; and also, when so requested, to recommend the maximum hours of labour proper in the occupation or industry. The findings and recommendations of the conference shall be made a matter of record for the use of the Board.

Power of Board to approve recommendation of conference and make order fixing minimum wage, maximum hours, and conditions of labour.

8. (1.) Upon the receipt of such recommendations from a conference, the Board shall review the same, and may approve any or all of such recommendations, or it may disapprove any or all of them and recommit the subject or the recommendations disapproved of to the same or a new conference. After such approval of the recommendations of a conference the Board shall issue an obligatory order specifying the minimum wage for employees in the occupation affected, and may also specify such maximum hours of labour and such conditions of labour and employment as are deemed necessary or expedient for the welfare of the employees. Such order shall become effective in sixty days from the date thereof, or if the Board shall find that unusual conditions necessitate a longer period, then the Board shall fix a later date on which such order shall become effective. Said order shall be published in one issue of the British Columbia Gazette at least thirty days before the same becomes effective. After such order is effective, it shall be unlawful for any employer in the occupation named in said order to employ or pay employees less than the minimum wage or to require or to permit employees to work for longer hours or under conditions of labour and employment contrary to the terms specified in said order. The Board shall send by mail, so far as practicable, to each employer in the occupation named a copy of said order, and each employer shall be required to post a copy of said order in each room in which employees affected by the order are employed.

Inexperienced employees over eighteen years to be licensed.

(2.) Where by any order heretofore or hereafter issued by the Board under this section in respect of any occupation, trade, or industry a minimum wage for inexperienced employees is fixed at a rate less than the minimum wage fixed by the order for experienced employees, no employer in that occupation, trade, or industry shall hereafter employ any employee over eighteen years of age at a wage less than the minimum wage so fixed for experienced employees, unless the employee is the holder of a licence under section 10, and is employed in conformity with the provisions of that section.

Reconsideration of minimum wage upon petition.

9. After a minimum wage has been fixed by the Board in any occupation, upon petition of either employers or employees the Board may in its discretion reopen the question and reconvene the former conference or call a new one, and any recommendations made by such conference shall be dealt with by the Board in the same manner as the original recommendations of a conference.

Licences to women physically defective and apprentices, fixing special minimum wage.

10. (1.) In the case of women who are physically defective, and in the case of female apprentices over eighteen years of age in any occupation in which apprentices are usually employed, the Board may in respect of any occupation, trade, or industry as to which a minimum wage has been fixed issue to any such woman or apprentice a special licence authorizing her employment in that occupation, trade, or industry at a minimum wage, to be fixed in the licence, less than the minimum wage fixed for that occupation.

Licences to inexperienced women fixing special minimum wage.

(2.) In the case of women over eighteen years of age who are desirous of learning any occupation, trade, or industry in respect of which a minimum wage has been fixed, and in which apprentices are not usually employed, and who have not had sufficient experience, in the opinion of the Board, or as defined in any order of the Board relating to that occupation, trade, or industry, to qualify them as experienced employees therein, the Board may in respect of that occupation, trade, or industry issue to any such woman a special licence authorizing her employment in that occupation, trade, or industry at a minimum wage according to the rate fixed in the order for inexperienced employees, or, if no rate has been fixed therein for inexperienced employees, at a minimum wage, to be fixed by the Board in the licence, less than the minimum wage fixed for that occupation, trade, or industry.

Licences to be issued in discretion of Board.

(3.) Every special licence under this section shall be issued only in the discretion of the Board, and in cases where the Board is satisfied that the application therefor is made in good faith, and shall remain in force for such period as is fixed by the Board.

Employment of special licensees limited.

(4.) The number of employees holding special licences under this section employed in any plant or establishment shall not exceed one-seventh of the whole number of the employees in that plant or establishment: Provided that in any plant or establishment where less than seven employees are employed one employee holding a special licence may be employed.

Employment of licensees and girls under eighteen years limited.

(5.) The aggregate number of employees holding special licences under this section and employees under eighteen years of age employed in any plant or establishment shall not exceed thirty-five per centum of the whole number of the employees in that plant or establishment.

Inquiry into wages, etc., of girls under eighteen years of age.

11. The Board may at any time inquire into wages, hours, and conditions of labour of girls under eighteen years of age employed in any occupation in the Province and may determine wages, hours, and conditions of labour suitable for such girls. When the Board has made such determination in the cases of girls under eighteen years of age it may proceed to issue an obligatory order in the manner provided for in section 8 of this Act, and after such order is effective it shall be unlawful for any employer in said occupation to employ a girl under eighteen years of age for less wages or for longer hours than are specified for girls under eighteen years of age in said occupation, or under conditions of labour prohibited by the Board for said girls under eighteen years of age in its order.

Penalty for discrimination against employee taking part in investigations.

12. Any employer who discharges or in any other manner discriminates against any employee because such employee has testified or is about to testify, or because such employer believes that said employee may testify, in any investigation or proceedings relative to the enforcement of this Act shall be liable, upon summary conviction, to a penalty of not less than twenty-five dollars and not more than one hundred dollars.

Penalty for violation of Act.

13. Every employer who employs an employee for whom a minimum wage has been fixed under this Act, at less than the minimum wage, or who employs

an employee for whom maximum hours of labour have been fixed under this Act, for longer hours than the maximum so fixed, or who neglects or fails to comply with any order made under this Act as to conditions of labour and employment, or who violates any provision of this Act, shall be liable, upon summary conviction, to a penalty of not less than twenty-five dollars and not more than one hundred dollars.

Employee entitled to recover full minimum wage.

14. If any employee is paid less than the minimum wage to which she is entitled under this Act, the said employee shall be entitled to recover from her employer, in a civil action, the balance between the amount of the minimum wage and the amount paid, together with costs and solicitors' fees, to be fixed by the Court.

Application of Act.

15. This Act shall not apply to farm-labourers, fruit-pickers, or domestic servants or their employers.

Evidence of effectiveness of orders.

16. (1.) Evidence of any order of the Board may be given by the production of a copy of the British Columbia Gazette purporting to contain a copy of the order. Such copy of the order as set out in the Gazette shall be conclusive evidence that the order was duly and regularly made, and that all matters and things required or directed to be done or performed prior to the order being made or becoming effective were duly done and performed, and that the order was duly and sufficiently published and became effective upon the day or date it purports to become effective as set out in the order.

Section retrospective.

(2.) This section shall be retrospective in its application, and shall apply in respect of orders heretofore made or purporting to have been made as well as to orders hereafter made or purporting to be made.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1922.

THE

UNIVERSITY OF BRITISH COLUMBIA

VANCOUVER, B.C.

BALANCE-SHEET AND STATEMENT

OF

RECEIPTS AND DISBURSEMENTS

AS AT

MARCH 31ST, 1922

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty
1922.

To His Honour WALTER CAMERON NICHOL,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

I beg herewith respectfully to present the Financial Statement of the University of British Columbia for the year ending March 31st, 1922.

J. D. MACLEAN,

Minister of Education.

May, 1922.

VANCOUVER, B.C., April 30th, 1922.

The Hon. J. D. MacLean, M.D., C.M.,
Minister of Education, Victoria, B.C.

SIR,—The Financial Statement of the University of British Columbia for the year ending March 31st, 1922, is herewith presented.

Yours very truly,

L. S. KLINCK,
President.

UNIVERSITY OF BRITISH COLUMBIA.

BALANCE-SHEET AND STATEMENT OF RECEIPTS AND DISBURSEMENTS.

VANCOUVER, B.C., April 19th, 1922.

The Chancellor and Board of Governors,
The University of British Columbia,
Vancouver, B.C.

DEAR SIRS,—I beg to submit the following annual statements for your approval:—

Balance-sheet as at March 31st, 1922, and statement of receipts and disbursements for the year ending March 31st, 1922.

UNIVERSITY SITE, POINT GREY.

During the year the sum of $5,684.94 was expended at Point Grey, the greater part of which was for additions and alterations to the dormitories which are now rented in suites to the farm-workers. As will be noted in the statement of disbursements, this work cost $4,976.50, while the balance was for erecting electric-light poles, etc.

UNIVERSITY SITE, FAIRVIEW.

The sum of $3,668.14 was expended on buildings and fixtures during the year. This comprises the balance of contract for additions to Biology and Chemistry Buildings and lockers and tables for Departments of Bacteriology and Chemistry.

PROVINCIAL GOVERNMENT GRANT.

The Provincial Government grant for the year ending March 31st, 1922, was $445,000, and a special grant of $1,500 was received towards the Summer School work.

OTHER GRANTS AND CONTRIBUTIONS.

During the year 1921–22 the University received $43,000 under the Dominion "Agricultural Instruction Act," and $5,600 from the Canadian Red Cross Society (British Columbia Branch) towards the maintenance of the Department of Public Health. These grants are given for salaries, travelling expense, etc., in agricultural extension work and salaries of teaching staff in the Department of Public Health respectively, and cannot be used for general university purposes.

STUDENTS' SCHOLARSHIPS, PRIZES, AND LOANS.

The Khaki University presented to the University of British Columbia the sum of $12,000 as an endowment for the Khaki University and Y.M.C.A. Memorial Scholarship and Loan Fund for Returned Soldiers. Province of British Columbia bonds bearing interest at 6 per cent. per annum for the sum of $12,000 were purchased at a cost of $95.52, giving an annual income of $720.

The Captain LeRoy Memorial Fund was added to by a purchase of $2,500 of Province of British Columbia bonds, making a total endowment for this fund of $4,500, giving an annual revenue of $260.

The Vancouver Women's Canadian Club presented to the University three Dominion of Canada War Loan bonds to the total value of $1,550 as an endowment for the Vancouver Women's Canadian Club Scholarship in Canadian History.

Details of the above-mentioned bonds, along with all the others held by the University, will be found in detail under "Assets," subheading "Trusts."

Cash scholarships and prizes presented to the University during the year will be found in detail under "Receipts," subheading "Students' loans, scholarships, and prizes."

DEPRECIATION ON BUILDINGS AND EQUIPMENT.

The usual procedure has been followed regarding depreciation—namely, an allowance of 10 per cent., the same being added to general expenditures.

BOOK-STORE (STUDENTS' TEXTS).

The book-store was operated during the year under the Bursar's Department and shows a profit of $2,554.42, while the total receipts from this source show $2,591 in excess of expenditures for the purchase of texts during the current year.

RENTS, PRODUCE, AND LIVE STOCK AT POINT GREY.

The sum of $11,375.77 was received from the above departments and this amount was credited to general expenditures. (*See* "Receipts" for details.)

FIRE INSURANCE.

The amount of fire insurance in force at March 31st, 1922, was $283,190, distributed as follows:—

University buildings, Point Grey	$65,100 00	
„ „ Hospital site	90,380 00	
		$155,480 00
Library books and students' texts		52,100 00
Equipment		75,610 00
Total		$283,190 00

Unexpired fire-insurance premiums at March 31st, 1922, amount to $5,382.64, and this has been shown on the balance-sheet as an asset of the University.

The fire insurance has been adjusted during the year on a *pro rata* basis, so that all companies with whom insurance is carried are liable for their *pro rata* share of any loss which may occur on any or all buildings, equipment, etc.

Your obedient servant,

F. DALLAS,
Bursar.

SUMMARY STATEMENT OF REVENUE AND EXPENDITURES FOR THE YEAR ENDING MARCH 31ST, 1922.

1921.			
April 1st. Balance in Bank of Montreal—			
Bursar's Account		$ 500 00	
Trust Account No. 1		.....	
„ No. 2		6,368 08	
„ No. 3		253 95	
		$ 7,122 03	
Cash in hand, Bursar's Account		175 73	
			$ 7,297 76
RECEIPTS.			
Provincial Government Grants—			
Vote No. 107, for year April 1st, 1921, to March 31st, 1922	$445,000 00		
Special grant for 1921 Summer School work	1,500 00		
		$ 446,500 00	
Burrell grant (Dominion Agricultural Instruction Act)	$ 43,000 00		
Less disbursed during year	23,936 82		
		19,063 18	
Fees received from students—			
Supplemental	$ 1,830 00		
Sessional registration	38,900 00		
Graduation (May, 1921)	1,540 00		
Summer School	1,340 00		
Carried forward	$ 43,610 00	$ 465,563 18	$ 7,297 76

RECEIPTS—*Continued.*

Brought forward	$ 43,610 00	$ 465,563 18	$ 7,297 76
Fees received from students—*Continued.*			
Public Health	650 00		
Short Course in Botany	104 00		
Short Course in Mining	10 00		
Special examinations	105 00		
Duplicate certificates	25 00		
Rereading	40 00		
Late fees	254 00		
	$ 44,798 00		
Students' caution-money, 1921–22 (returnable)	4,740 00		
		49,538 00	
Produce and live stock sold—			
Department of Animal Husbandry $1,562 73			
„ Dairying 936 42			
„ Horticulture 419 20			
„ Poultry Husbandry 7,499 72			
	$ 10,418 07		
Rents of cottages and suites at Point Grey	957 70		
		11,375 77	
Department of Book-store (students' texts)		2,591 00	
Canadian Red Cross Society (British Columbia Branch), contribution towards maintenance of Department of Public Health	$ 5,600 00		
Less disbursed *re* above	5,599 92		08
Wesbrook Memorial Fund—			
Received from Alma Mater Society of University of British Columbia	$ 473 72		
Interest on Bank Savings Account	10 05		
		483 77	
Students' loans, scholarships, and prizes—			
Anne Wesbrook Scholarship	$ 100 00		
Scott Memorial Scholarship	110 00		
LeRoy Memorial Scholarship	442 16		
Convocation Scholarship	50 00		
B.C. Dairymen's Association prizes	100 00		
Public Health Nursing prizes	300 00		
Students' loans repaid	225 00		
University of B.C. scholarships and prizes	200 95		
Shaw Memorial Scholarship	137 50		
McGill Graduates' Scholarship	137 50		
Terminal City Club Scholarship	110 00		
Dunsmuir Scholarship	165 00		
Wesbrook Prize	50 00		
Women's Liberal Association Prize	25 00		
Historical Society Prize	25 00		
Arts '19 Scholarship	150 00		
Applied Sociology Prize	25 00		
Special scholarship donated by Dr. Lilian Fowler	450 00		
Vagabond Club Prize	25 00		
Women's Canadian Club Scholarship	150 00		
Vancouver Women's Conservative Association Prize	25 00		
B.C. Fruit-growers' Association Scholarship	100 00		
Carried forward	$ 3,103 11	$ 529,551 80	$ 7,297 76

RECEIPTS—*Continued.*

Brought forward	$ 3,103 11	$ 529,551 80	$ 7,297 76
Students' loans, scholarships, and prizes—*Continued.*			
U.B.C. Players' Club Scholarship	50 00		
Dean Brock Graduate in Applied Science Scholarship	100 00		
Khaki University and Y.M.C.A. Memorial Fund	845 12		
		4,098 23	
Total receipts			533,650 03
			$ 540,947 79

EXPENDITURES.

CURRENT ACCOUNT.

Department of Administration—			
President's Office—			
Salaries	$10,249 92		
Supplies and expenses	323 95		
Total expenditures, President's Office		$ 10,573 87	
Bursar's Office—			
Salaries	$ 8,399 88		
Supplies and expenses	492 37		
Total expenditures, Bursar's Office		8,892 25	
Buildings and Grounds—			
Salaries (Janitors)	$11,946 20		
Maintenance and repairs	26,270 72		
Total expenditures, Buildings and Grounds		38,216 92	
Library—			
Salaries	$ 8,419 92		
Supplies and expenses	4,288 32		
Total expenditures, Library		12,708 24	
Registrar's Office—			
Salaries	$ 6,900 00		
Supplies and expenses	957 33		
Total expenditures, Registrar's Office		7,857 33	
Adviser to Women Students—			
Salaries	$ 1,409 70		
Total expenditures, Adviser to Women Students		1,409 70	
Miscellaneous—			
Supplies and expenses	$24,873 68		
Physical examinations	514 50		
Examination expenses	3,417 20		
Total expenditures, Miscellaneous		28,805 38	
Total expenditures, Department of Administration			$108,463 69
Carried forward			$108,463 69

CURRENT ACCOUNT—*Continued.*

Brought forward			$108,463 69
Department of Agriculture—			
Dean's Office—			
Salaries	$ 2,509 92		
Supplies and expenses	275 00		
Total expenditures, Dean's Office		$ 2,784 92	
Agronomy—			
Salaries	$12,359 88		
Wages, supplies, and expenses	8,229 07		
Total expenditures, Agronomy		20,588 95	
Animal Husbandry—			
Salaries	$10,414 94		
Wages, supplies, and expenses	17,449 01		
Total expenditures, Animal Husbandry		27,863 95	
Dairying—			
Salaries	$ 7,509 96		
Wages, supplies, and expenses	4,875 21		
Total expenditures, dairying		12,385 17	
Horticulture—			
Salaries	$11,110 08		
Wages, supplies, and expenses	8,617 73		
Total expenditures, Horticulture		19,727 81	
Poultry Husbandry—			
Salaries	$ 6,339 96		
Wages, supplies, and expenses	12,639 17		
Total expenditures, Poultry Husbandry		18,979 13	
General Farm—			
Wages, supplies, and expenses	$14,748 78		
Total expenditures, General Farm		14,748 78	
Total expenditures, Department of Agriculture			117,078 71
Department of Arts and Science—			
Dean's Office—			
Salaries	$ 3,980 04		
Supplies and expenses	300 00		
Total expenditures, Dean's Office		$ 4,280 04	
Bacteriology—			
Salaries	$ 3,806 04		
Supplies and expenses	1,077 45		
Total expenditures, Bacteriology		4,883 49	
Carried forward		$ 9,163 53	$225,542 40

CURRENT ACCOUNT—*Continued.*

Brought forward		$ 9,163 53	$225,542 40
Department of Arts and Science—Continued.			
Botany—			
Salaries	$ 8,453 30		
Wages, supplies, and expenses	4,080 76		
Total expenditures, Botany		12,534 06	
Chemistry—			
Salaries	$18,561 94		
Supplies and expenses	3,650 81		
Total expenditures, Chemistry		22,212 75	
Classics—			
Salaries	$12,799 80		
Supplies and expenses	25 44		
Total expenditures, Classics		12,825 24	
Economics—			
Salaries	$10,862 39		
Supplies and expenses	29 39		
Total expenditures, Economics		10,891 78	
English—			
Salaries	$20,669 27		
Supplies and expenses	20 90		
Total expenditures, English		20,690 17	
Geology and Mineralogy—			
Salaries	$17,356 80		
Supplies and expenses	717 57		
Total expenditures, Geology and Mineralogy		18,074 37	
History—			
Salaries	$ 8,252 85		
Supplies and expenses	98 80		
Total expenditures, History		8,351 65	
Mathematics—			
Salaries	$19,495 22		
Supplies and expenses	62 31		
Total expenditures, Mathematics		19,557 53	
Modern Languages—			
Salaries	$21,627 39		
Supplies and expenses	135 95		
Total expenditures, Modern Languages		21,763 34	
Philosophy—			
Salaries	$ 8,199 96		
Total expenditures, Philosophy		8,199 96	
Carried forward		$164,264 38	$225,542 40

Current Account—*Continued.*

Brought forward		$164,264 38	$225,542 40
Department of Arts and Science—*Continued.*			
Physics—			
Salaries	$12,819 84		
Supplies and expenses	1,052 75		
Total expenditures, Physics		13,872 59	
Zoology—			
Salaries	$ 6,294 92		
Supplies and expenses	520 09		
Total expenditures, Zoology		6,815 01	
Extension-work—			
Supplies and expenses	$ 375 66		
Total expenditures, Extension-work		375 66	
Total expenditures, Department of Arts and Science		185,327 64	
Department of Applied Science—			
Dean's Office—			
Salaries	$ 2,960 04		
Supplies and expenses	100 00		
Total expenditures, Dean's Office		$ 3,060 04	
Civil Engineering—			
Salaries	$12,564 88		
Supplies and expenses	20 47		
Total expenditures, Civil Engineering		12,585 35	
Forestry—			
Salaries	$ 3,999 96		
Supplies and expenses	369 51		
Total expenditures, Forestry		4,369 47	
Mechanical Engineering—			
Salaries	$16,430 33		
Supplies and expenses	995 74		
Total expenditures, Mechanical Engineering		17,426 07	
Mining—			
Salaries	$12,051 61		
Supplies and expenses	367 33		
Total expenditures, Mining		12,418 94	
Nursing—			
Salaries	$ 600 00		
Supplies and expenses	18 80		
Total expenditures, Nursing		618 80	
Carried forward		$ 50,478 67	$410,870 04

CURRENT ACCOUNT—*Continued.*

Brought forward		$ 50,478 67	$410,870 04
Department of Applied Science—*Continued.*			
Public Health—			
Salaries	$ 434 35		
Supplies and expenses	352 20		
Total expenditures, Public Health		786 55	
Total expenditures, Department of Applied Science			51,265 22
Students' Loans, Scholarships, and Prizes—			
Scholarships and prizes		$ 5,032 50	
Total Expenditures, Loans, Scholarships, and Prizes			5,032 50
Miscellaneous (General)—			
Honorary Advisory Council, Scientific and Industrial Research-work	$ 16 67		
Students' caution-money refunded	4,446 75		
Alma Mater fees refunded	5 00		
Students' caution-money collectable	$64 98		
Less students' caution-money returnable	52 85		
	12 13		
		$ 4,480 55	
Total expenditures, Miscellaneous (General)			4,480 55
Total expenditures, Current Account			$471,648 31

CAPITAL ACCOUNT.

Department of Administration—			
President's Office—			
Furniture and equipment	$ 42 94		
Total expenditure, President's Office		$ 42 94	
Bursar's Office—			
Furniture and equipment	$ 4 27		
Total expenditure, Bursar's Office		4 27	
Buildings and Works—			
Additions and alterations to buildings	$ 8,644 64		
Electric-light poles	363 15		
Land-clearing	345 29		
Total expenditure, Buildings and Works		9,353 08	
Library—			
Furniture and equipment	$ 623 13		
Books	5,139 20		
Total expenditure, Library		5,762 33	
Registrar's Office—			
Furniture and equipment	$ 3 79		
Total expenditure, Registrar's Office		3 79	
Carried forward		$ 15,166 41	$471,648 31

CAPITAL ACCOUNT—*Continued.*

Brought forward	$ 15,166 41		$471,648 31
Department of Administration—*Continued.*			
Miscellaneous—			
Furniture and equipment	$ 2,042 60		
Total expenditure, Miscellaneous		2,042 60	
Total expenditure, Department of Administration			$ 17,209 01
Department of Agriculture—			
Agronomy—			
Furniture and equipment	$ 287 98		
Total expenditure, Agronomy		$ 287 98	
Animal Husbandry—			
Furniture and equipment	$ 138 24		
Live stock	600 00		
Total expenditure, Animal Husbandry		738 24	
Dairying—			
Furniture and equipment	$ 2,478 09		
Books	36 77		
Total expenditure, Dairying		2,514 86	
Horticulture—			
Furniture and equipment	$ 611 50		
Total expenditure, Horticulture		611 50	
Poultry Husbandry—			
Furniture and equipment	$ 321 83		
Live stock	137 50		
Total expenditure, Poultry Husbandry		459 33	
General Farm—			
Furniture and equipment	$ 2,287 00		
Total expenditure, General Farm		2,287 00	
Total expenditure, Department of Agriculture			6,898 91
Department of Arts and Science—			
Bacteriology—			
Furniture and equipment	$ 487 42		
Books	79 75		
Total expenditure, Bacteriology		$ 567 17	
Botany—			
Furniture and equipment	$ 910 63		
Books	85 91		
Total expenditure, Botany		996 54	
Carried forward		$ 1,563 71	$ 24,107 92 $471,648 31

CAPITAL ACCOUNT—*Continued.*

Brought forward	$ 1,563 71	$ 24,107 92	$471,648 31
Department of Arts and Science—*Continued.*			
Chemistry—			
Furniture and equipment	$ 3,259 85		
Total expenditure, Chemistry		3,259 85	
Classics—			
Furniture and equipment	$ 38 50		
Books	54 78		
Total expenditure, Classics		93 28	
Economics—			
Furniture and equipment	$ 60 00		
Total expenditure, Economics		60 00	
English—			
Furniture and equipment	$ 27 00		
Books	19 15		
Total expenditure, English		46 15	
Geology and Mineralogy—			
Furniture and equipment	$ 1,348 26		
Books	92 07		
Total expenditure, Geology and Mineralogy		1,440 33	
History—			
Furniture and equipment	$ 115 64		
Total expenditure, History		115 64	
Mathematics—			
Books	$ 34 65		
Total expenditure, Mathematics		34 65	
Modern Languages—			
Books	$ 21 82		
Total expenditure, Modern Languages		21 82	
Philosophy—			
Books	$ 2 35		
Total expenditure, Philosophy		2 35	
Physics—			
Furniture and equipment	$ 4,429 55		
Books	6 65		
Total expenditure, Physics		4,436 20	
Carried forward		$ 11,073 98	$ 24,107 92 $471,648 31

CAPITAL ACCOUNT—*Continued.*

Brought forward	$ 11,073 98	$ 24,107 92	$471,648 31
Department of Arts and Science—*Continued.*			
Zoology—			
Furniture and equipment	$ 1,089 88		
Books	12 30		
Total expenditure, Zoology	1,102 18		
Total expenditure, Department of Arts and Science		12,176 16	
Department of Applied Science—			
Civil Engineering—			
Furniture and equipment	$ 125 50		
Total expenditure, Civil Engineering	$ 125 50		
Forestry—			
Furniture and equipment	$ 946 40		
Books	258 03		
Total expenditure, Forestry	1,204 43		
Mechanical Engineering—			
Furniture and equipment	$ 5,438 04		
Books	37 76		
Total expenditure, Mechanical Engineering	5,475 80		
Mining—			
Furniture and equipment	$ 884 49		
Books	40 44		
Total expenditure, Mining	924 93		
Total expenditure, Department of Applied Science		7,730 66	
Students' Loans, Scholarships, and Prizes—			
LeRoy Memorial Scholarship Endowment, Province of B.C. bonds	$ 2,570 45		
Loans to students	2,005 00		
Total expenditure, Students' Loans, Scholarships, and prizes		4,575 45	
Total expenditure, Capital Account			48,590 19
Total expenditure for all purposes, year ended March 31st, 1922			$520,238 50

CASH ACCOUNT.

Receipts as above		$540,947 79
Disbursements—		
As above	$520,238 50	
Overdraft, April 1st, 1921, Bank of Montreal	730 10	
Cash on hand and in bank, March 31st, 1922	19,979 19	
		540,947 79

BALANCE-SHEET AS AT MARCH 31ST, 1922.

LIABILITIES.

Accounts payable—			
S. N. McLeod, balance on Agronomy barn	$ 61 00		
Students' caution-money, Session 1921–22	4,704 00		
		$ 4,801 00	
Burrell grant (Dominion "Agricultural Instruction Act"), balance of funds unexpended	20,136 21		
Canadian Red Cross Society (British Columbia Branch), unexpended balance of contribution towards the maintenance of Department of Public Health	3,202 14		
		23,338 35	
			$ 28,139 35
Grants from Provincial Government of British Columbia (for period from 1910 to March 31st, 1922)—			
Site for the University, Point Grey, at nominal value		$ 1 00	
Gift of museum collection, growing plants, records, etc., at nominal value	$ 20,000 00		
Gift of seven Clydesdale mares, valued at	4,600 00		
		24,600 00	
Amount disbursed direct by Government		48,407 73	
Amount received by Governors of the University for general purposes for year 1916	$354,660 65		
Amount received by Governors of the University for general purposes for year 1916–17	200,000 00		
Amount received by Governors of the University for general purposes for year 1917–18	225,000 00		
Amount received by Governors of the University for general purposes for year 1918–19	220,000 00		
Supplemental vote for year 1918–19	46,000 00		
Special grant towards building and maintenance of Forest Products Laboratory, year 1918–19	2,500 00		
Supplemental Vote No. 175A for supplies from King's Printer, year 1918–19	3,078 92		
Amount received by Governors of the University for general purposes for year 1919–20	285,000 00		
Supplemental grant for year 1919–20	103,000 00		
Vote No. 99 for year 1920–21	420,000 00		
Vote No. 107 for year 1921–22	445,000 00		
Special grant for 1921 Summer School work	1,500 00		
		2,305,739 57	
Amount received by Governors of the University for completion of Science Building at Point Grey		69,524 00	
			2,448,272 30
Gifts from individuals of equipment, books, etc.			5,000 00
Trusts—			
Royal Institution for the Advancement of Learning of British Columbia Students' Loans and Scholarships Fund (established August, 1915)	$ 32,059 45		
McGill Graduates' Scholarship Endowment	2,500 00		
Shaw Memorial Scholarship Endowment	2,500 00		
Dunsmuir Scholarship Endowment	3,000 00		
		$ 40,059 45	
Carried forward		$ 40,059 45	$2,481,411 65

LIABILITIES—*Continued.*

Brought forward			$ 40,059 45	$2,481,411 65
Trusts—*Continued.*				
Terminal City Club Scholarship Endowment			2,000 00	
Captain LeRoy Memorial Scholarship Endowment			4,500 00	
Scott Memorial Scholarship Endowment			2,000 00	
Khaki University and Y.M.C.A. Scholarship Endowment			12,000 00	
Vancouver Women's Canadian Club Scholarship Endowment			1,550 00	
Wesbrook Memorial Fund, amount at credit			737 72	
R. P. McLennan, Scholarship, amount at credit		$ 75 00		
B.C. Fruit-growers' Association Prize, amount at credit		100 00		
U.B.C. Players' Club Prize, amount at credit		50 00		
Khaki University and Y.M.C.A. Funds, amount at credit	$ 845 12			
Less amount on loan to students	750 00			
		95 12		
Royal Institution Loans and Scholarships Fund, amount at credit	$3,900 00			
Less amount on loan to students	1,560 00			
	$2,340 00			
Less advanced on Scott Memorial Scholarship	55 00			
		2,285 00		
U.B.C. Scholarships and Prizes Fund, amount at credit		146 27		
Women's Canadian Club Scholarship Fund, amount at credit		75 00		
McGill Graduates' Scholarship Fund, amount at credit		12 51		
Dunsmuir Scholarship Fund, amount at credit		15 00		
LeRoy Memorial Scholarship Fund, amount at credit		334 46		
Public Health Nursing prizes, amount at credit		100 00		
			3,288 36	
				66,135 53
				$2,547,547 18

ASSETS.

Site for University—			
Granted by Provincial Government, comprising Lots 3044, 3045, 3045A, 4804, 4805, 4806, and 4807, Group 1, N.W.D. ("British Columbia University Site Act, 1919," Amendments 1913 and 1918), at nominal value		$ 1 00	
Add expenditure for surveying, clearing, and grading, etc., to March 31st, 1920	$107,102 54		
Add expenditure from April 1st, 1920, to March 31st, 1922	31,816 42		
Add pipe-line, year ending March 31st, 1921	2,562 16		
Add new tarvia road, year ending March 31st, 1921	10,459 16		
Add light to barn, year ending March 31st, 1921	280 00		
Add sewer-drain to farm buildings, year ending March 31st, 1921	530 21		
Add fencing, year ending March 31st, 1921	285 00		
Carried forward	$153,032 49	$ 1 00	

ASSETS—*Continued.*

Brought forward	$153,032 49	$ 1 00	
Site for University—*Continued.*			
Add tile for land-draining, year ending March 31st, 1921	50 50		
Add electric-light poles, year ending March 31st, 1922	363 15		
		153,449 14	
			$ 153,450 14
Buildings and works (Point Grey)—			
Including general plans, Science Building under construction, docks, etc., at cost to March 31st, 1920	$124,972 63		
Horticultural storage-barn, Point Grey, at cost	5,053 97		
Dairy-barn, bull-pen, manure-tank, and two cottages at Point Grey, at cost	24,440 59		
Hay-barn and feed-store at Point Grey, at cost	5,914 35		
Poultry colony houses and fencing at Point Grey, at cost	6,421 05		
Horse-barn and two cottages at Point Grey, at cost	22,944 67		
Agronomy barn at Point Grey, at cost	11,717 83		
Bunk-house and equipment, Point Grey, at cost	1,819 77		
Dormitories at Point Grey purchased from S.C.R.	2,000 00		
Additions and alterations to dormitories purchased from S.C.R.	4,976 50		
Additions to Dairy Products Building at Point Grey, at cost	1,377 00		
Beef-barn and Dairy Products Building at Point Grey, at cost (reverted to University from Dept. of S.C.R.)	8,434 42		
Vocational Building, smithy and carpenter-shop at Point Grey at cost (reverted to University from Dept. of S.C.R.)	9,059 53		
Three 100-bird poultry-houses at Point Grey, at cost (reverted to University from Dept. of S.C.R.)	1,085 00		
		230,217 31	
Buildings and works (hospital site)—			
Temporary buildings erected at hospital site, at cost	23,523 95		
Temporary buildings taken over from McGill University at valuation	17,379 85		
Temporary buildings erected at Hospital site, at cost	40,864 86		
Additions to Library and Chemistry Buildings at Hospital site, at cost	2,940 00		
Additions to Chemistry and Biology Buildings at Hospital site (including lockers and benches), at cost	57,633 04		
Cafeteria and smithy buildings (reverted to University from Dept. of S.C.R.)	3,571 35		
Garage, machine-shop, and commercial buildings (reverted to University from Dept. of S.C.R.)	12,640 58		
		158,553 63	
		$ 388,770 94	
Less depreciation allowed to March 31st, 1922		132,252 28	
			256,518 66
Carried forward			$ 409,968 80

ASSETS—*Continued.*

Brought forward			$ 409,968 80
Equipment—			
Furniture, Administration and Departmental Offices, Specimens, etc., at cost to June 30th, 1915	$ 6,029 81		
Taken over from McGill College at valuation	12,769 60		
Purchased from July 1st, 1915, to March 31st, 1922, at cost	169,742 56		
	$ 188,541 97		
Less depreciation allowed to March 31st, 1922	60,827 03		
			127,714 94
Live stock—			
Department of Agriculture (General Farm)	$ 625 00		
„ Horticulture	700 00		
„ Animal Husbandry	22,420 00		
„ Poultry Husbandry	4,374 00		
			28,119 00
Museum collection, growing plants, records and equipment, a gift from the Provincial Government, valued at	$ 20,000 00		
Gifts to Departments of Geology and Physics	1,000 00		
			21,000 00
Library books—			
Distributed as to departments at cost in Vancouver to June 30th, 1915	$ 25,407 80		
Gifts of books to Library, valued at	4,000 00		
Taken over from McGill University at valuation	1,910 00		
Purchased from July 1st, 1915, to March 31st, 1922	46,433 96		
		$ 77,751 76	
Books (departmental)		1,795 11	
Book-store—Students' texts on hand at March 31st, 1922		10,757 25	
			90,304 12
Supplies (departmental) on hand at March 31st, 1922			9,033 80
Unexpired insurance premiums at March 31st, 1922			5,382 64
Sundry accounts receivable—			
Convocation expenses, 1912–13	$ 437 85		
Corporation of Point Grey, water-mains	17,989 38		
Competition premium, architect's plans (balance)	3,500 00		
			21,927 23
Trusts—			
Royal Institution for the Advancement of Learning of British Columbia, eight Victory War Loan bonds, Nos. V044139–46M, for $1,000 each, bearing interest at 5½ per cent. per annum, maturing December 1st, 1922; being endowment for the McGill Graduates, Shaw Memorial, and Dunsmuir Scholarships	$ 8,000 00		
Terminal City Club, two Victory War Loan Bonds, Series T, Nos. E001718 and E276690, for $1,000 each, bearing interest at 5½ per cent. per annum, maturing November 1st, 1933, and November 1st, 1934, respectively; being endowment for the Terminal City Club Scholarship	2,000 00		
LeRoy Memorial, two Victory War Loan Bonds, Series T, Nos. M097378 and M07379, for $1,000 each, bearing interest at 5½ per cent. per annum, maturing November 1st, 1934, and three Province of British Columbia Gold Coupon Debentures, Nos. D.H. 621 and 622, for $1,000 each, and D.I. 989 for $500, bearing interest at 6 per cent. per annum, maturing June 15th, 1941; being endowment for the Captain LeRoy Memorial	4,500 00		
Carried forward	$ 14,500 00		$ 713,450 53

ASSETS—*Continued.*

Brought forward	$ 14,500 00	$ 713,450 53
Trusts—*Continued.*		
Scott Memorial, eight Victory War Loan Bonds, Series T, No. A357042, $100; Series T, No. A175867, $100; Series T, No. A175868, $100; Series T, No. A175869, $100; Series T, No. A175870, $100; Series T, No. B063924, $500; Series T, No. B063926, $500; Series T, No. B063927, $500, bearing interest at 5½ per cent. per annum, maturing November 1st, 1934; being endowment for the Scott Memorial Scholarship	2,000 00	
Khaki University and Y.M.C.A. Memorial Fund, twelve Province of British Columbia Gold Coupon Debentures for $1,000 each, bearing interest at 6 per cent. per annum, maturing June 15th, 1941; being endowment for the Khaki University and Y.M.C.A. Memorial Scholarships and Loans for Returned Soldiers	12,000 00	
Vancouver Women's Canadian Club, three Victory War Loan Bonds, Series T, Nos. E457894, B068082, and H163555, for $1,000, $500, and $50 respectively, bearing interest at 5½ per cent. per annum, maturing November 1st, 1934; being endowment for the Vancouver Women's Canadian Club Scholarship in Canadian History	1,550 00	
		30,050 00
Balances in Bank of Montreal—		
General Current Account	$ 15,200 02	
Bursar's Account	500 00	
Trust Account No. 2 (Scholarships and Loans Account) $3,288 36		
Trust Account No. 3 (Wesbrook Memorial Account) .. 737 72		
	4,026 08	
	$ 19,726 10	
Balance, cash in hand, Bursar's Account	253 09	
		19,979 19
General expenditures, including administration and departmental salaries, supplies, travelling and other expenses, telephones, fuel, and heat, power, light, water rates, fire-insurance premiums, maintenance and repairs of buildings, depreciation on buildings and equipment, examinations, graduation, congregation, and convocation expenses, etc. (including McGill University College grant of $10,000)—		
To June 30th, 1915	$ 66,496 31	
From July 1st, 1915, to March 31st, 1922	1,717,571 15	
		1,784,067 46
		$2,547,547 18

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1922.

REPORT

ON THE

ENGINEERING AND ECONOMIC FEATURES

OF THE

PACIFIC GREAT EASTERN RAILWAY

BY

J. G. SULLIVAN, Consulting Engineer.

THE GOVERNMENT OF
THE PROVINCE OF BRITISH COLUMBIA.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1922.

Engineering and Economic Features of the Pacific Great Eastern Railway.

By J. G. Sullivan, Consulting Engineer.

Winnipeg, Man., June, 1922.

The Hon. John Oliver,
Minister of Railways, Province of British Columbia.

Dear Sir,—Your letter of instructions dated April 19th, 1922, handed to me on my arrival at Vancouver April 20th, 1922, is as follows:—

"*J. G. Sullivan, Esq.,*
Consulting Engineer, Vancouver, B.C.

"Dear Sir,—There is a very general opinion throughout British Columbia that the Pacific Great Eastern as built traverses territory, a great portion of which is never likely to produce traffic of moment, and that this particular portion—namely, from Green Lake to Clinton—should be abandoned, and that instead of completing the Pacific Great Eastern along the north shore of Howe Sound, connecting Squamish with North Vancouver by rail, a line should be built between Clinton and Ashcroft connecting with the Canadian National Railways or the Canadian Pacific Railway, or both, thus affording a direct entry into Vancouver, where the terminals of both lines would be available and interchange made practicable with Canadian and American trunk lines, with the British Columbia Electric Railway, and with all wharves and docks.

"It is also held by these same people that the uncompleted gap (45 miles in length) between Red Rock Creek and Cottonwood Canyon should not be finished now, but that even if it is considered necessary to finish the gap referred to, it should be completed simultaneously with the Clinton–Ashcroft line, and an arrangement made with Canadian National or Canadian Pacific to operate, thus obviating the necessity of purchasing about $1,500,000 of extra equipment which would have to be procured if we should operate between Squamish and Prince George. Your opinion on the feasibility or desirability of the abandonment referred to and the construction of the Clinton–Ashcroft connection is sought.

"You will be furnished with profiles of the line showing the old and new work separately, and where any line changes have been made, and your opinion is desired as to whether these changes were beneficial or otherwise to the Pacific Great Eastern Railway.

"Copies of the original contract, documents giving reasons for decreases and increases made in prices from those in the original contract will be submitted to you for your consideration.

"You will also advise on the plans and profiles showing the various routes by which the Pacific Great Eastern might be extended to the eastern boundary of the Province, connecting with the Alberta lines.

"I have instructed the Railway Department to put at your disposal every record of any kind whatever which you may desire to enable you to make a report as to whether the work carried out since the line was taken over by the Government was economically performed.

"A complete bridge report as of December 31st, 1921, will be submitted to you, so that you may form your opinion as to a programme of bridge renewals, especially on the section between Chase and Squamish.

"I have only outlined a few things which occur to me at the moment, but of course many others will occur to yourself.

"'The Government desires to have a full and complete report on the work carried out under its control, and to have your advice as to what is best to do in the future with this line so as to make it able to meet charges in the near future, as it is at present almost an unsupportable burden on the people of the Province.

"Yours truly,
John Oliver,
Minister of Railways."

Complying with the terms of this letter and your further verbal confirmation that the economic features be fully discussed, I have arranged the questions and points to be discussed under the following heads:—

A.—Routes and Detail of Location.
B.—Physical Features of the Line.
C.—Amount constructed and General Type of Construction.
D.—Financial Conditions.
E.—Revenue and Traffic Expenses, Traffic Statistics, Equipment.
F.—Revenue necessary to pay Fixed Charges plus Operating Expenses.
G.—Rates and Ton-miles a Necessity in the Production of Revenue.
H.—Ability of Adjacent Country to produce Required Revenue.
I.—Was Government justified in making Revision of Line at Crossing of Cottonwood River?
J.—Was Government justified in making Revision at Crossing of Quesnel River?
K.—Should Portion of Line South of Clinton be abandoned and Line built from Clinton to connect with C.P.R. or C.N.R. at Ashcroft?
L.—Should the Line from Quesnel to Prince George be completed and put in Operation?
M.—Should Line be extended from Prince George to Peace River Country; and, if so, by what Route?
N.—Was the Work carried out since the Government took charge economically performed?
O.—Were decreases and increases in Unit Prices of Original Contract justified?
P.—Advisability of getting one of the Larger Railway Companies to operate the line.
Q.—Advice as to what should be done to enable Line to meet Charges in the Near Future.

The above subjects and questions I will deal with in detail to the best of my ability in non-technical terms, but when any of the conclusions or deductions are based on technical data, I will supply the same in the Appendices in order that your engineers may be fully advised as to the basis of my reasoning.

A.—ROUTES AND DETAILS OF LOCATION.

It is evident that the principal object in constructing the line was to make a rail connection between Vancouver and the Grand Trunk Pacific Railway. The route chosen was to start at North Vancouver, where practically no terminal facilities were provided, follow the sea-shore a distance of 42 miles to Squamish at the head of Howe Sound. Grades on this portion of line are undulating; maximum of 1 per cent. against traffic in both directions. From Squamish the line runs in a north-easterly direction over a divide and into the Pemberton Valley, where the Lillooet River is crossed; this is in the Harrison River drainage-basin. From Squamish the line follows the Squamish River Valley to the Cheakamus; thence up the valley of the latter to Mons Summit, a distance of approximately 40 miles, rising in this distance 2,100 feet, maximum 2.2 per cent. grade against N.B. traffic. Going down to Pemberton via valleys of the Green and Soo Rivers there is a drop of 1,400 feet on 2.2 per cent. maximum grade against S.B. traffic, a distance of 20 miles.

From the crossing of the Lillooet River the line continues in a north-easterly direction, going over the divide between the Harrison River drainage-basin to that of the Fraser River, which is crossed at the town of Lillooet.

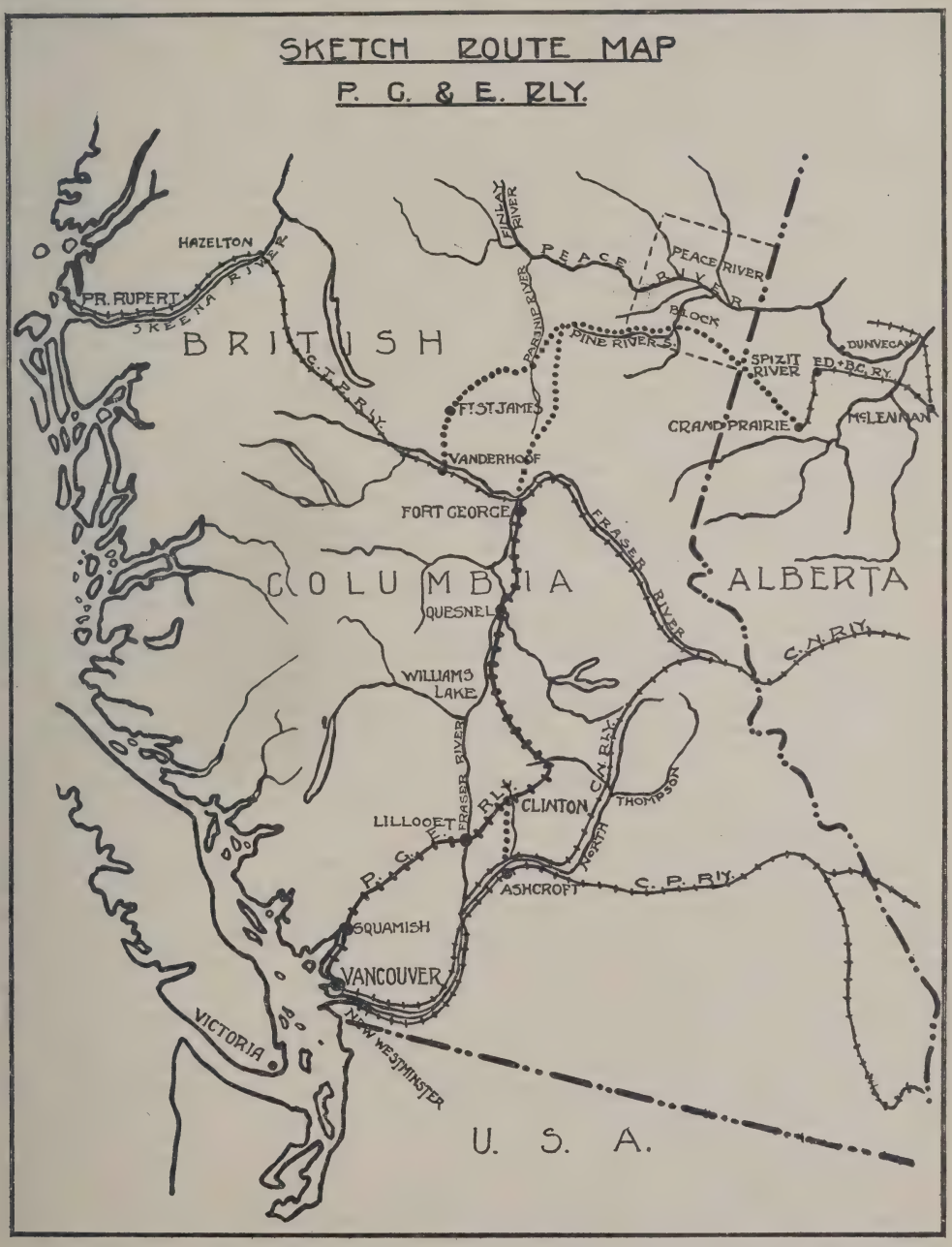
In crossing the divide the line follows the valley of the Birkenhead River a distance of 15 miles, rises a little over 900 feet on 2.1 per cent. maximum grade, then drops down the valley of Anderson Creek to Anderson Lake, a distance of 12 miles, using maximum grade of 2 per cent., dropping 730 feet. From D'Arcy to Lillooet, a distance of 35 miles, the grades are undulating; 1 per cent. maximum against traffic in both directions.

From Lillooet the line continues in a north-easterly direction, leaving the valley of the Fraser and going over the divide between the Fraser River drainage-basin and into that of the Thompson, reaching a maximum elevation of 3,865 feet above sea-level at Horse Lake, 85 miles from Lillooet. This point is on a high plateau between the headwaters of the Bonaparte River and Prize Creek, both tributaries of the Thompson River.

From Horse Lake Summit the line turns north-westerly to Williams Lake, a distance of 70 miles, entering the valley of the Fraser without crossing any apparent divide.

From Lillooet to Kelly Lake Summit, a distance of 33 miles, the line rises 2,750 feet, using a maximum 2.2 per cent. grade.

From Kelly Lake Summit to Horse Lake Summit, a distance of 52 miles, the grades are undulating; maximum of 1 per cent. against N.B. and 0.75 per cent. against S.B. traffic. From Horse Lake Summit to Williams Lake the maximum grade against S.B. traffic is 1 per cent.



From Williams Lake to Prince George, 150 miles, the line runs in a northerly direction, with a slight bearing to the west. It follows the valley of the Fraser River, but at an elevation above the water of the river varying from 200 feet to 700 feet until it reaches a point some 10 miles

south of Prince George. From this latter point to Prince George the line approaches nearer to high-water level. The one exception to this is at Quesnel, where the line is in the town at an elevation of a few feet above high water. The greatest distance between the line and the river is north of Quesnel, where the line was carried back some 10 to 15 miles to avoid bad country adjacent to the Fraser River and to obtain a favourable crossing of the Cottonwood River.

The grades between Williams Lake and Prince George are undulating, 1 per cent. against N.B. traffic, with the one exception of 10 miles of 2.2 per cent. N.B. out of Quesnel. The maximum S.B. grade is 0.75 per cent., with one exception of 5 miles of 0.85 per cent. south-bound out of Quesnel.

ALTERNATE ROUTES.

The first question one would ask when looking at a map of the Pacific Great Eastern Railway would be, Why did the line not follow the valley of the Fraser from Lillooet to Prince George? The answer is that the nature of the country between Lillooet and Prince George, through which the Fraser passes, is such that it is entirely impracticable to follow the valley at water-level as is done on the Lower Fraser and Thompson Rivers, the obstruction being cut-banks and sliding material; therefore, starting where they did from the south end, there was no other alternate route to follow. It has been suggested that there is a possibility of a 2.2 per cent. line up the Capilano Canyon and from this summit get a feasible line to Mons Summit, thus shortening the line very considerably. I doubt the feasibility of getting such a line, and as any investigation into this matter at the present time would be in the nature of a post-mortem and have little bearing on the present problem, I did not deem it advisable to go to any expense in making such investigation.

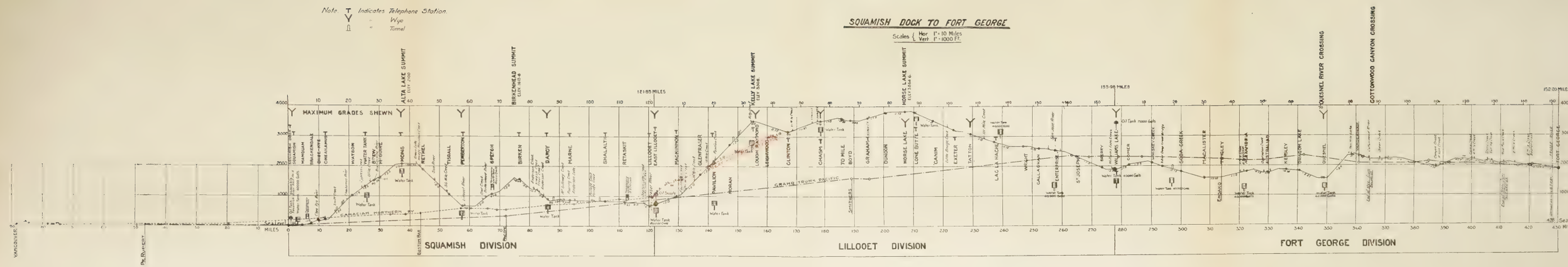
A second general route would be to go in from Ashcroft and connect with the present line at Clinton. This would have been a much better line to operate and would have made a great saving in construction costs. This route might not have suited the object of the promoters. The best route to connect the Grand Trunk Pacific with Vancouver is that followed by the Canadian National Railway. (*See* condensed profile attached for further details.)

DETAILS OF ROUTE.

There is very little to criticize about the details of the route with one or two exceptions. At Lillooet the line keeps south of the old town and crosses the Fraser by a very long bridge with expensive foundations. If the line had been carried through the old town, a very much shorter crossing could be obtained north of the town with solid rock foundations. My past experience would lead me to believe that there were two major factors which influenced the promoters in adopting the present line: First, this being a division-point, the possibility of making money out of a separate townsite: second, the tendency of the "old-timer" to place a fictitious value on his property and thus make the construction of a line through the town impracticable on account of the cost of the right-of-way.

The second point where there is a difference of opinion is at Quesnel, on account of the sliding material south of the Quesnel River. My personal opinion is that, from an economic point of view, the best route would have been to keep 3 or 4 miles farther back from the Fraser and go via Dragon Lake, cross the Quesnel River at a higher elevation, and avoid the 2.2 per cent. pusher grade north from Quesnel. As between the line built by the old company and the revision made by the Government engineers, there is very little, if any, economic difference, with the balance in favour of the Government engineers' line on account of the latter going through the town and being in a somewhat better position to interchange traffic between the railway and the river, if any such traffic should develop. The same factors that were mentioned in the case of Lillooet might have applied at this point, and after the line had been actually graded outside the town the Government engineers had the advantage in dealing with the matter of high-priced right-of-way.

The third point is the crossing of the Cottonwood River. In this case I have no hesitancy in saying that the route chosen by the Government engineers is in all economic features far superior to the line built by the railway company's engineers, and in making this statement I do not imply that the company engineers were not capable and efficient engineers; it is one of those unfortunate mistakes that we are all apt to make at times. It was probably caused by the reconnaissance engineer approaching the crossing from the wrong direction. More will be said about the latter cases under separate heads.


SQUAMISH DOCK TO FORT GEORGE
Scales { Hor 1" = 10 Miles
Vert 1" = 1000 FT.
Note. T Indicates Telephone Station.
Y " Wye
⊓ " Tunnel
MAXIMUM GRADES SHEWN
ALTA LAKE SUMMIT
BIRKENHEAD SUMMIT
KELLY LAKE SUMMIT
HORSE LAKE SUMMIT
FRASER RIVER CROSSING
COTTONWOOD CANYON CROSSING
GRAND TRUNK PACIFIC
CANADIAN NORTHERN RY
SQUAMISH DIVISION
LILLOOET DIVISION
FORT GEORGE DIVISION
VANCOUVER
PR. RUPERT
Sea Level

LOCATION.

The locating engineers of this line are to be complimented in their successful locating of a line to fit the contour of the country. I have never been over a line the length of the Pacific Great Eastern Railway where one could find so few points of detail in location to criticize. The curves of 2° and over are all spiralled and the line so located as to make excavation balance embankments, all of this tending to economic construction if it were not for the adverse physical features of the country.

B.—PHYSICAL FEATURES.

I have never before seen such a large area of country where the physical features were so adverse to the economic construction of a railway. First, the amount of clay, sand, gravel, gumbo, and other such material compared with the amount of solid rock is very much larger than would be expected in the mountains. Second, the unstable condition of all material (other than solid rock) when wet is the cause of forcing the line from the valleys of the Fraser to higher ground, thus preventing the line being built on a reasonably low rate of grade. In climbing out and dropping into the valleys, the line encounters either sheer rock bluffs with ragged contour, necessitating comparatively heavy tunnelling and heavy rock-cuttings, or encounters this unstable material which increases cost of construction and makes the cost of maintenance almost prohibitive.

I am sure that your present maintenance charges on the first 8 miles south of Quesnel are more than the total earnings of Quesnel Station, and that this condition will continue every year for three or four months each spring. All of these combined adverse conditions makes it impossible to construct an economic line. If it were not for these adverse conditions, combined with the adverse financial conditions during time of construction, there is no doubt but that the Pacific Great Eastern Railway would have compared most favourably with other lines in the matter of economic construction.

We were of the opinion that the Panama gave an unusual amount of trouble, but I believe that if the percentage of solid rock to other material in the Panama was as small as it is on the Pacific Great Eastern Railway, and if this other material on the Isthmus was as unstable as the material on the Pacific Great Eastern, then the canal would never have been completed.

C.—AMOUNT CONSTRUCTED AND GENERAL TYPE OF CONSTRUCTION.

The line is constructed and in operation from North Vancouver to Whytecliff, a distance of 12.7 miles. From Whytecliff to Squamish, a distance of about 29 miles, no construction has been undertaken. This portion of the line follows a very rugged shore of rock bluffs, and the construction of this portion of the line is estimated to cost from $3,500,000 to $4,000,000.

From Squamish to Quesnel, a distance of 350 miles, the line is constructed and in operation. From Quesnel to Prince George the grading is completed with the exception of cleaning out slides that have occurred since the line was graded some six years ago. The track is laid from Quesnel to Cottonwood River, a distance of 17½ miles, and also from junction of Pacific Great Eastern Railway with Grand Trunk Pacific Railway (about 1 mile east of Prince George) to Red Rock Creek, 18 miles south of Prince George, leaving a gap of 45 miles with no steel. The steel track fastenings and ties for this work are on the ground. Cottonwood River is to be crossed by a steel viaduct, requiring about 2,450,000 lb. of steel. Of this amount, 2,262,565 lb. has been fabricated and is now at Walkerville, Ontario. The cost of this steel and fabrication has been paid for. There yet requires to be ordered about 190,000 lb. The cost of this amount, with freight charges on the total, will have to be met if the line is completed. None of the concrete foundations for this viaduct have been started. In addition to this, there is some 8,000,000 feet B.M. of trestles to be put in. Nearly all this timber is on the ground and paid for excepting the stringer, about 840,000 feet B.M. To complete this gap and put the line in condition to be operated is estimated to cost from $500,000 to $600,000. If this additional line is put in operation it is estimated that extra equipment to the value of $1,500,000 will be required; that is, to put the line from Quesnel to Prince George into operation will require over $2,000,000 new capital. To complete both gaps between North Vancouver and Prince George would require about $6,000,000 new capital.

TYPE OF CONSTRUCTION.

The line is built in accordance with good branch-line standards; 70-lb. steel on grades of 2 and 2.2 per cent., with 60-lb. steel at other places, all very liberally supplied with a good type of tie-plates on curves. The bridges and culverts are of wood, which is a standard on new construction in a timber country. In my practice I have not found it economical to use wooden spans. On this road there has been constructed twenty-seven wooden spans varying in length from 60 to 150 feet, a total length of 3,180 feet. It is possible that, on account of the difficulty in getting or on account of the very high price of steel during the time of the construction of this line, the engineers were justified in the use of wood for this purpose. In addition to the 3,180 lineal feet of truss spans and the wooden foundations for same, there is already in place 27,000,000 feet B.M. of wooden trestles and culverts, with about 8,000,000 feet B.M. more to go in to complete the Quesnel to Prince George gap.

I estimate that to renew these wooden structures with permanent work, such as steel viaducts and trusses, concrete culverts and fills, and concrete foundations for the spans and viaducts, it will cost over $8,000,000. Some of your engineers are of the opinion that this estimate is too low, which I know is a fact if the work had to be done at present prices, but we are all hoping for lower prices in railway-construction. However, under the most favourable conditions the Government must be prepared to supply at least $8,000,000 new capital for these renewals within the next ten years. The alternative is to renew in wood at an enormous maintenance cost and one will about balance the other; that is, the extra cost of maintenance will balance the interest charges for more permanent construction.

There is one criticism to make on the track-laying, and it appears to be worse on that portion laid by the Government engineers. I refer to the expansion. Steel rails usually fail first by battered ends, and nothing tends more to hasten the battering of the ends of the rails than to have them laid with too much expansion.

D.—FINANCIAL CONDITIONS.

The total par value of the outstanding financial debt is $44,226,403.12. Of this amount, $5,925,195 is held by the company. This had been pledged to the Canadian Bank of Commerce by the former management as security for a loan of $4,800,000. The Government loaned the company $5,280,914.15 to repay the bank loan with interest. This leaves outstanding $38,301,208.12 as at December 31st, 1921, for which the company is liable. The interest charges for the year ending December 31st, 1921, amounted to $1,911,913.14. The total investment in road and equipment at December 31st, 1921, was $38,438,590.23. This is the net sum on the company's books after the sum of $5,618,248.41 has been credited. This amount was made up of various items as set out in the agreement of February 22nd, 1918, whereby Foley, Welch & Stewart agreed to waive all claims against the Province of British Columbia and the Pacific Great Eastern Railway, also subsidiary companies. On the other hand, the Government took over the railway and subsidiary companies, relieving the contractors of liability account of same companies on the payment of $750,000 in cash, turning over to the Pacific Great Eastern Railway Company the assets of the Pacific Great Eastern Development Company and those of the Pacific Great Eastern Equipment Company. Those assets consisted of lands, townsites, docks and wharves, locomotives, cars, and stores of all kinds. In addition to the above, the contractors waived claim to $245,000 unpaid estimates and $1,647,563.02 of retained percentages on progress estimates, the whole totalling $5,618,249.41, which has been credited to the various accounts as follows:—

Land for transportation purposes	$ 890,473 00
Grading	3,559,787 01
Tunnels and subways	91,276 59
Bridges, trestles, and culverts	821,489 30
Track-laying and surfacing	91,276 59
Interest	163,945 92
	$5,618,249 41

Of this $38,438,590.23 investment, $10,543,530.79 has been expended in paying interest charges during construction and deficit in operating revenue during construction.

E.—EQUIPMENT, REVENUE, AND TRAFFIC EXPENSES.

The rolling-stock consists of twelve locomotives very well assorted for this class of road. The heaviest are about up to the limit that the standard of construction will admit.

There are two gas-electric cars and two gas-motor cars operating out of North Vancouver. There are twelve passenger, one combination, and two baggage cars in passenger service. In freight service there are 258 cars of various types. There are sixty-eight cars in company service; the majority of these cars are for construction purposes. The management claims that the present equipment is sufficient for operation as far as Quesnel, but that if they put the line under operation between Quesnel and Fort George they would require at least to spend $1,500,000 in new equipment. My opinion is that, if new business sufficient to justify the completion of the line to Fort George would develop, this estimate is too low.

REVENUE AND EXPENSES.

During the year 1921 the Pacific Great Eastern Railway carried 15,290 passengers for a total of 1,462,871 passenger-miles; total receipts from this business, $63,889.87, or at the rate of $0.043 per passenger-mile. Passenger earnings per mile of road operated, $323.86. During the same year they handled 53,351 tons of freight for a total 4,634,231 ton-miles at a rate of $0.057 per ton-mile. Revenue per mile of road operated, $844.70.

Average number of ton-feet per loaded-car mile	16.98
Average number of ton-feet per train-mile	89.26
Total operating revenue per mile of road	$1,076,458 00
Total operating expense per mile of road	2,239.033 00
Operating deficit per mile of road	1,162,575 00
Total gross income from all sources	484,326 88
Total gross corporate expenses	2,689,205 14
Net corporate loss	$2,204,878 26

This was charged:—

To interest during construction	$1,911,913 14
To operating loss during construction	292,965 12

On account of there being earned from rent of equipment in construction during the year, $88,632. For the purpose of studying future prospects I have based my studies on the actual loss shown in operating account; $368,542.02 as the actual loss or deficit in operating for the year.

F.—REVENUE NECESSARY TO PAY FIXED CHARGES AND OPERATING EXPENSES.

If the road is completed from North Vancouver to Prince George it will require to complete and equip an additional $6,000,000 of new capital, and within the next ten years, to replace wooden structures, another $8,000,000. Adding this to the present investment of $38,438,950 will give a total final investment of $52,438,950.23 for 470 miles of railway, or nearly $112,000 per mile of road.

The interest charges will be	$1,911,913 14
Plus 5 per cent. on $14,000,000	700,000 00
	$2,611,913 14

Or over $5,500 per mile of road.

If only the Quesnel–Prince George gap be completed, then the new capital would only be $10,000,000, making a total of $48,438,950.23 for approximately 440 miles of road, or $110,000 per mile of road. The interest charges would be:—

Present interest charges	$1,911,913 14
Plus 5 per cent. on $10,000,000	500,000 00
	$2,411,913 14

Or nearly $5,500 per mile of road.

If no more construction be done and the line from Quesnel to Prince George be abandoned, there should be at least $250,000 of salvage, and to replace the wooden structure south of Quesnel should not require over $6,500,000.

In this case the total investment would be	$38,438,950 00
Plus new capital for renewals, less salvage	6,250,000 00
	$44,688,950 00

There would be 360 miles of road on an investment of $124,000 per mile of road.

The interest charges would be	$1,911,913 14
Plus 5 per cent. on $6,250,000	312,500 00
	$2,224,413 14

That is over $6,100 per mile of road. Therefore it is self-evident that, regardless of what action the company may decide to take, they are faced with an ultimate interest charge of about $5,500 per mile of road. Some one, either the taxpayers of British Columbia or the patrons of the road, must pay, in addition to the cost of operating the road, a charge of $5,500 a mile in interest for the use of the plant. To emphasize this feature I wish to compare this figure with what the patrons of the Canadian Pacific Railway have to pay per mile of road for the use of this plant. In the year 1921 the Canadian Pacific Railway paid out of railway revenue, fixed charges, dividends on preferred stock, and dividends on common stock, $32,946,448.81, or at the rate of $2,450.64 per mile of road operated, a figure considerably less than half of what the fixed charges will be on the Pacific Great Eastern Railway. If you add to the above amount 3 per cent. on common stock, paid from profits from subsidiary companies and outside operation, the total amount paid out will be $40,746,448.81, or at the rate of $3,030.83 per mile of road operated. To make $5,500 a mile above operating expenses, the road would have to take in $22,000 per mile and operate at a ratio of 75 per cent. The Canadian Pacific Railway operating ratio last year was 82.28 per cent. If the Pacific Great Eastern Railway could not do any better it would require a revenue of over $31,000 per mile of road.

G.—RATES AND TON-MILES A NECESSITY IN THE PRODUCTION OF REVENUE.

A railway operating through a country similar to that through which the Pacific Great Eastern runs, with a very small ratio of population to mileage and no hopes of any through passenger business, is more than fortunate if they can make their passenger business pay the cost of same, and freight traffic is the only other source of revenue from which a profit can be expected. This profit, if the concern is to be a success, must at least be sufficient to pay interest on investment (fixed charges). There are two all-important factors in the production of freight revenue: First, ton-miles of traffic; second, and just as important, is the rate per ton-mile. Management is a factor, but without ton-miles and a reasonable rate per ton-mile the best management in the world cannot make a success of a road similar to the Pacific Great Eastern Railway.

Freight rates is the subject of more contention than any other business matter, and I realize that I will be criticized for discussing same, but it is of so much importance to the very existence of the Pacific Great Eastern Railway that it would be a neglect of duty not to discuss this matter, for the reason that it must be apparent to everybody that the freight rates on the Pacific Great Eastern Railway will have to be increased to enable the road to pay operating expenses, to say nothing of paying fixed charges, and, as I have indicated before, the Government is fully justified in increasing the rates to within a reasonable margin of the rates charged by their competitors.

The deficit of $368,542.02 in your operating account of 1921 is caused almost entirely by too low a freight rate. You may not agree with the above statement, but let us analyse the same. All shippers and business-men will argue to the contrary. They will tell you that your average rate of 5.7 cents per ton-mile is ridiculously high and that it should be about 1.25 cents, something near the average for the entire continent. They will tell you that there are about 1,000 miles of privately owned and operated logging-roads in British Columbia, and if a private company can build and operate a railway, why cannot the Government do so? The answer is that the private road is built and operated on sound business principles. The owner of timber lands will estimate how much timber he has to cut, how long it will take him to cut the timber, and how much it will cost to build and operate the road. He will then divide the sum by the

number of thousand feet of timber he has to haul out. The result, be it at a rate of 2 cents or $1 per ton-mile, he will add to his cost of production, and if there is still a chance to sell the product at a profit the road will be built; that is, the traffic must bear the expense of operating plus the cost of construction. If the operation was to be continuous, then the traffic would have to bear the cost of operation plus the interest on the capital invested. If he finds that the traffic will not bear the expense the road is not built. Is there any business-man who will argue that the cost per ton-mile is the same on all or any two of these various roads that go to make up 1,000 miles mentioned above? Is there any logical argument that can be put forward to prove that because the New York Central Railway can operate at a profit at 1 cent per ton-mile, a four-track road between Buffalo and New York with over 100 trains per day, with light rates of grade, with capital charges per mile for construction not much, if any, greater than that of the Pacific Great Eastern Railway, that the rates on the Pacific Great Eastern Railway, with heavy grades and light traffic, should not exceed 1 cent per ton-mile?

What were the conditions before the Railway was constructed? The rate, I am informed, from Ashcroft to Barkerville was 11 cents per pound. This, I compute, amounted to about 80 cents per ton-mile. This was over a highway built by the Government on which the freighters paid no toll or any item to defray interest charges and at a time when the dollar was worth much more than it is to-day. The freighters, during the construction of the road, hauling construction materials, oats and other farm products, using modern motors on roads constructed and maintained without any cost to them, charged from 75 cents to $1.25 per ton-mile. Now when the road is in operation they complain because they have to pay a rate of 1.2 cents and for short haul or less than car-load lots up to 10 cents or more per ton-mile. I fully realize the difficulty in making satisfactory rates or equitable rates. There are certain commodities that cannot move if they had to bear a rate to pay the cost of operation plus interest. These commodities, I know, will have to be moved at low rates. Providing the rate is not actually below operating cost, no railway management, either private or public, is justified in carrying any class of freight at less than cost, thereby imposing an unjust burden on the other patrons of the road or upon the taxpayers, as the case may be. Another factor is competition that you must meet, providing the traffic can be carried at a rate not less than the cost of operation. Let us put the question in this light: Would any sane business-man build a factory where the construction costs, on account of adverse conditions, were from three to five times what they would be in more favourable locations, where the operating costs would be from 50 to 100 per cent. greater than in more favourable conditions, and where the production would be limited to one-tenth or one-twentieth of the capacity of the plant, if under all these adverse conditions he would be compelled to sell his products at the same price as his competitors who were working under the most favourable conditions? On the other hand, if the expediency demanded the construction of the plant under these adverse conditions, what would he think of those who would argue that the products of this plant be sold to local patrons at the same price local patrons of the more favourably located plant would pay?

When the price charged for motor-haul running on a Government-constructed highway is from 50 to 100 times the rates charged by a railway with an operating ratio of 191.6 per cent. and the deficit made up by the taxpayers, there is created an injustice that should not be tolerated.

If the Eskimos are discussing the railway question, they cannot blame their small amount of trade on railway rates, as they have no railway. Their adverse condition which restricts their trade is location. Now, if railway connections were made with all parts of their country and the possible trade of that country was required to bear the cost of operation and interest on investment, trade would not be increased because the traffic could not bear the expense. We might then, however, hear the Eskimo join in the popular cry that they were victims of unjust freight rates. There is one objection to raising freight and passenger rates on the Pacific Great Eastern Railway—namely, that those who are opposed to Government ownership and operation of railways will use the fact as an argument to further their ideas, but such an argument will not be a logical one or a just one. It has nothing whatever to do with Government ownership or Government operation. It is a business matter, pure and simple. A road is constructed over mountains involving very heavy construction charges, very heavy rates of grade involving heavy operating expense, and the traffic is very limited. For argument's sake, we will assume that the traffic is sufficient to pay interest on fixed charges plus operating expenses at rates of 50 per cent. of these charged by the railway's competitors (freighters). Is it not an economical proposition to build the road and reduce transportation charges by 50 per cent.? Have the people of that

district any right to say that they should not pay more than 2 or 3 per cent. of what they previously had to pay and that the balance should be paid by the taxpayers? They are not suffering from unreasonable freight rates, but rather from unfavourable location, exactly as is the case of the Eskimo. I am not criticizing the rates of grade on the Pacific Great Eastern Railway as the most economical rates for the country were used. Nothing can be gained on long hills by sacrificing distance and curvature to reduce the rate of grade.

H.—ABILITY OF ADJACENT COUNTRY TO PRODUCE REQUIRED REVENUE.

The Canadian National Railways have a much shorter and much cheaper line to operate to Vancouver than via the Pacific Great Eastern Railway connection. No business of any moment can be expected from that source; therefore the Pacific Great Eastern Railway must depend almost entirely on business developed along its own line.

The gross corporate expense per year if the line was completed to Prince George from Squamish only would be $3,000,000 annually. If passenger service could be doubled it would amount to less than $200,000, leaving $2,800,000 to be collected from freight revenue. To meet this demand:—

At	5 cents	per	ton-mile	would require.....	56,000,000 ton-miles.
„	10 „	„	„	.....	28,000,000 „
„	15 „	„	„	.....	18,333,333 „
„	20 „	„	„	.....	14,000,000 „

This without any allowance for extra cost of doing the extra business that would produce this ton-mileage. The total ton-mileage for the year 1921 was 4,634,231 ton-miles, less than one-third of the amount required at the high rate of 20 cents per ton-mile. The number of tons of revenue freight handled in the year 1921 was 53,351. With the amount shipped out of Vancouver slightly in excess of the amount received, the amount shipped out of Vancouver was less than 20,000 tons. If we assume that as population increased this amount might reach 80,000 or 100,000 tons.

To ascertain approximately how much the line would have to develop, let us assume that all freight is hauled one-half the total length of line, and that the road can be operated at an operating ratio of 67 per cent., and that the receipt will be 5 cents per ton-mile, then there will be required to pay the fixed charges of $5,500 per mile, 917,000 ton-miles at 1⅔ cents profit for every ton-mile for each mile of track over 400,000,000 ton-miles for 440 miles of road. It may be asked why 400,000,000 ton-miles is compared with 56,000,000 ton-miles mentioned above. The former comparison is made to show what high rates would have to be charged to simply pay fixed charges and was based on the absurd assumption that from three up to ten times the present business could be handled without increasing the operating expenses. In this study we contemplate getting a high rate for freight and for that reason have assumed a very low operating ratio of 67 per cent., much better than has been realized in years on any road of 400 miles or more. To complete the study, say 100,000 tons of outgoing freight at 220 miles equals 22,000,000 ton-miles, leaving a balance of 378,000,000 ton-miles to be produced from business from the line, or dividing 378,000,000 ton-miles by half length of line, 220 miles gives 1,700,000 tons of freight to be developed on the line; about 4,000 tons per mile of track per year. It may be argued that my estimate of freight shipped in is too low. Let us assume that the inward freight would amount to one-third of the total, or 140,000,000 ton-miles, leaving 250,000,000 ton-miles for outward freight. This would mean the handling of at least 1,200,000 tons, or a production of nearly 3,000 tons per mile of track per year. During the year 1921 the outward freight from the line amounted to 36,505 tons. Average number of miles in operation was 292, or 125 tons per mile. It requires some optimism to believe that the business of this line can increase between 2,400 and 3,200 per cent. If you could double the rate to, say, 10 cents per ton-mile and operate the road at three times the expenses of 1921, then it would require to pay expenses seven and one-half times the business done in 1921, or an increase of 750 per cent. There would be a possibility of obtaining this result were it not for three prominent adverse conditions: First, very limited area capable of producing any traffic; second, while the valleys are most fertile when irrigated, very little can be produced on the majority of the land adjacent to the line without irrigation; third, the water available for cheap irrigation is very limited, and on account of the unstable nature of the ground, other than solid rock, it is very doubtful if any large irrigation scheme could be made an economical success.

For the above reasons no large agricultural development can be expected in the country adjacent to the Pacific Great Eastern Railway.

For the same reasons, on account of the long winter and the difficulty in procuring winter feed, and while there are some fine, large cattle-ranges in Upper Lillooet and in the Cariboo, no further development of any account can be expected in the stock-raising industry.

The timber industry is limited to the first 60 to 70 miles, and with the exception of the first 20 miles the timber areas are quite patchy. There might develop some business in pulp-wood timber, but on account of the necessary heavy freight charges and heavy operating expense on account of the heavy grades this development is in the far future.

The mining industry does not offer much, no matter to what extent the gold-mines may develop. Free-gold mining, be it placer or quartz, does not produce tonnage for a railway like that produced by the mining of coal, iron, or copper ores, etc.

There is only one conclusion that can be reached—namely, that as a local line between Vancouver or Squamish and Prince George the country will not produce enough traffic at any reasonable rate to pay operating expenses plus fixed charges. Regarding further extension of line, this matter will be discussed under another heading.

I.—WAS THE GOVERNMENT JUSTIFIED IN MAKING THE REVISION OF LINE AT CROSSING OF THE COTTONWOOD RIVER?

Six trains per day loaded for a 0.75 per cent. grade is the minimum number that would justify the building of the Pacific Great Eastern Railway at rates that the promoters would expect to obtain. I have therefore assumed that the promoters expected at least that much business and on that assumption. The annual saving in operating over the line adopted by the Government I calculate to be $31,777. The economic features in favour of the Government engineers' line was a saving of 5 miles in distance, a saving of 1,103° of curvature, and a saving of 137 feet in rise against traffic in both directions.

Another favourable feature was the capitalized value of maintaining 5 miles of track, the value of 5 miles of track material, track-laying, ballasting, fencing, and telephone-line. But the largest item was a saving of over $400,000 in favour of the Government line in the difference in the cost of the materials and the cost of erecting the river crossing. The total saving would justify an extra expenditure on the line constructed of $1,456,175, which fully justified the revision of the line. Your engineers may have submitted more favourable figures on account of their assuming the traffic at ten or more trains per day. (For further details *see* Appendix No. 1.)

J.—WAS THE GOVERNMENT JUSTIFIED IN MAKING REVISION OF LINE AT CROSSING OF QUESNEL RIVER?

The same remarks about the amount of traffic required to justify the building of the railway applies to this case as to the Cottonwood River.

In this case the economic operating features in favour of the revised line was a shortening of the distance by 1 mile and a saving in curvature of 318°, and against the revision was an additional 67 feet of rise against traffic in both directions. A slight saving in operating the revised line, capitalized and added to a considerable saving in the cost of the crossing of the Quesnel River, would justify an extra expenditure in grading the new line of $439,215, as against an expenditure by the Government of $861,028.82, indicating that from an economic point this revision was not justified. To justify this charge it would have to be assumed that an extra annual revenue of $21,090 would be received from Quesnel Station without any extra operating expense. I do not believe that the moving of the station into the town will make anything like that much of an increase in a revenue from that point.

The statement has been made that it would be more difficult to maintain the original line than the revised line. I could not see any reason for this conclusion; both lines are in very bad sliding and unstable ground for a considerable distance.

Another statement I have heard is to the effect that the Government engineers used a steeper rate of grade than was used on the original line. This is not the fact; the rates of grade are exactly the same on both lines. It is unfortunate that the Government did not adopt a rate of 3 or 4 per cent. south of the town, and thus save a large portion of the expenditure made, and leave the building of the 0.85-per-cent. grade until the traffic would justify the construction of the lower-grade line. (For further details *see* Appendix No. 2.)

K.—SHOULD PORTION OF LINE SOUTH OF CLINTON BE ABANDONED AND LINE BUILT FROM CLINTON TO CONNECT WITH C.N.R. OR C.P.R. AT ASHCROFT?

The reasons in favour of this change is the non-productive nature of the country for a distance of over 100 miles south of Clinton on the present line. The total receipt from freight, both forwarded and received, on this section during the year 1921 (after the line has been in operation for a number of years) did not exceed $400 per mile.

The cost of operation on account of heavy grades. (*See* condensed profile attached.)

The fact that there are over 8,000,000 feet B.M. of trestle timber on this section that will have to be renewed within a few years, also about 1,000,000 feet B.M. truss spans, besides the timber foundations at the crossing of the Fraser River at Lillooet.

There are three principal objections to the change: First, the cost of constructing 46 miles of new line; second, the necessity of making a division of revenues with another line; third, making another break in the railway, which increases the cost of operation.

The cost of the proposed line will not be less than $3,500,000, which will increase fixed charges by at least $175,000 per year. In addition to this, it is planned to use some 4,000,000 feet B.M. in wooden trestles on this line, which partially offsets one of the advantages in abandoning the old line.

There have been no negotiations as to making connections or division of revenue with the connecting road at Ashcroft, but it is doubtful if the Pacific Great Eastern Railway could get much better division than 2 in 1 on a mileage basis. As practically all the business handled by the connecting roads would be between Vancouver and Ashcroft, a distance of 209 miles, while, on the other hand, the average haul on the Pacific Great Eastern Railway on local business could not be assumed at more than half the length of the road, this means an average division of revenue on the basis of 3 to 2 in favour of the Pacific Great Eastern Railway. This assumption is based on ordinary rates. If the Pacific Great Eastern Railway should establish higher local rates they would be able to get a much better division, but in any case I do not believe they would succeed in retaining more than two-thirds or three-quarters of their revenue. To sum up, the company can do twice the business they are now doing without any real increase in expenses (practically all trains are running light). If this increase should take place the freight business to and from Vancouver to points north of Clinton might amount to $360,000 per year. A third of this, $120,000, or a quarter, $90,000, added to the fixed charges of $175,000 would equal loss of at least $265,000 per year, to be offset by a saving in train operation of 208 trains per year for a distance of 100 miles, less 46 miles of new line, or $208 \times 54 = 11,232$ train-miles.

The operating expenses per train-mile in 1921 was $8.67. Multiplying this figure by 11,232 train-miles gives a saving in this item of $97,381.64. It may be argued that the train-mile saving would be greater than this on account of running less than two trains per week on south end. This is doubtful, and in addition there will be considerable loss on account of operating the separate line out of Squamish and maintaining two shops, or either transferring equipment for repair over 250 miles from Ashcroft to Squamish over foreign lines. The saving on maintenance of 8,000,000 feet B.M. wooden trestles over that of 4,000,000 feet B.M. on the new line cannot amount to over $25,000 per year. Therefore, at more than double the present business the company would face an annual increase in deficit of over $120,000 by constructing this new line after crediting the cost with the salvage from the abandoned line.

While there is no doubt that the proposed line is far superior to the line constructed to handle business to Clinton and points north, the present development of the country will not warrant the construction of this line.

Do not spend money and increase your liability until the saving will more than pay interest on the investment; this is a very good rule to follow. I may be mistaken in the future possibilities of this country and there may come a time when this line would be justified.

If it is decided that, regardless of cost, the line from Clinton to Quesnel must be operated with a service as good as the present, must be maintained during the winter and summer, I would recommend that the entire line south of Clinton be abandoned, providing the timber interest at the south end could raise enough money to purchase any portion of the south end out of Squamish at a cost of from $15,000 to $20,000 per mile. If this portion of the line will not pay interest on that sum it should be abandoned. If such an arrangement could be made there would be some justification in spending money at once on the construction of the Ashcroft–Clinton line.

The salvage should amount to:—

66 miles at $20,000	$1,320,000 00
Salvage on balance, 100 miles, say	500,000 00
	$1,820,000 00

Or about half the cost of the Clinton cut-off.

The saving in operating expenses and the saving in renewals on the abandoned line would show a substantial saving over the interest on half the cost of the Clinton–Ashcroft Line.

L.—SHOULD THE LINE BE EXTENDED FROM PRINCE GEORGE TO PEACE RIVER COUNTRY; AND, IF SO, BY WHAT ROUTE?

The surveyed line extends north from Prince George, reaching the eastern boundary of the Province via Parsnip River and Pine River Pass in a distance of about 318 miles; to reach present railway connections in Grande Prairie country would require extension of 63 miles. Grande Prairie is south of the Peace River and with Spirit River country, which is also south of Peace River, contains about one-half of the developed area which is generally known as the Peace River country. The Peace River District proper is north of Peace River, and products from this district to reach the proposed extension of the Pacific Great Eastern Railway at the eastern boundary of the Province would require a rail-haul of nearly 300 miles, via Peace River Crossing, McLennan, and Grande Prairie, on the Edmonton & Dunvegan Railway. The alternative of this long haul is for a second line to be constructed west from the end of the Peace River extension of the Edmonton & Dunvegan Railway, west of Peace River Crossing to a point where a feasible crossing of the Peace River could be obtained. This involves the construction of 100 or more miles of extra new line. There is no feasible crossing of the Peace River north of Spirit River or for a long distance west.

The second route mentioned was to leave the Grand Trunk Pacific Railway at Vanderhoof, some miles west of Prince George, and go north via east end of Stewart Lake and finally reach the eastern boundary of the Province on the surveyed route. The advantage claimed for this route is that it traverses a much better country than that through which the survey was made. I did not have data sufficient to warrant an opinion as to which of the two would be the more desirable. I did not deem it advisable to spend time in collecting data or making a trip over these routes, as the traffic offered at present in the Peace River country will not justify construction of a line on either route.

The present freight rate on export grains from Grande Prairie to Vancouver by the longer routes is less than 1 cent per ton-mile, and these rates are very apt to be lowered, so that to get any business the Pacific Great Eastern Railway could not expect to get a revenue of over 1 cent per ton-mile, and making the favourable assumption that they could handle this business at an operating ratio of 75 per cent. that would give them ¼ cent per ton-mile profit. From Vancouver to Grande Prairie via Pacific Great Eastern would be about 850 miles. Two million bushels of grain per year is more than this country (Grande Prairie and Spirit River country) will produce annually as at present developed. If this were all wheat it would only amount to 60,000 tons; 60,000 tons × 850 miles × .0025 = $127,500, or a sum much less than one-tenth of the interest charges on the probable cost of the line from Grande Prairie to Prince George.

A second and more conclusive reason why it was unnecessary to study routes to Peace River country is that after making a very exhaustive study of routes from Prince George to Prince Rupert, to Squamish and to Vancouver, via Ashcroft, shows conclusively that if there is traffic enough offered in the Peace River country to warrant the construction of a line from the Grand Trunk Pacific Railway, either from Prince George or Vanderhoof to the Peace River District, such traffic will not reach tide-water either at Vancouver or Squamish, but at Prince Rupert. The reason for this is that taking the operating expense of hauling traffic from Prince George to Prince Rupert, a distance of 467 miles, at 100 per cent., then the operating expense for the same traffic over the Pacific Great Eastern Railway and Canadian National Railways via Ashcroft to Vancouver, a distance of 517 miles, would be 132 per cent.; to haul the same traffic over the Pacific Great Eastern Railway to Squamish, a distance of 429 miles, the expense would be 137 per cent. If the junction with the Grand Trunk Pacific Railway was made at Vanderhoof, taking the expense from Vanderhoof to Prince Rupert, a distance of 398 miles, at 100 per cent., then the expense over the other routes added to the expense of the portion between Vanderhoof

and Prince George over the Grand Trunk Pacific Railway would be respectively 164.9 per cent. to Vancouver and 171.5 per cent. to Squamish. It may be argued that if the Pacific Great Eastern Railway build the line to the Peace River country they would have control of the routing of traffic, but such is not a logical conclusion, for the reason that if there is business sufficient to warrant the Pacific Great Eastern Railway in constructing this line, then the same business would warrant the Canadian National building an independent line to get this business, if the Pacific Great Eastern Railway would not turn it over to them at the junction with the Grand Trunk Pacific Railway, because if it reached them at either Prince George or Vanderhoof they could make an enormous profit in hauling it to Prince Rupert at rates that would just cover the cost of operation over the other routes. Such duplication of lines would of course bankrupt the Pacific Great Eastern Railway proposition. As examples to further explain this matter, if the Grand Trunk Pacific Railway would operate between Prince George at the low ratio of 67 per cent., then for every dollar they spent they would have 33 cents profit with which to pay interest or dividends. To take this traffic to Vancouver via Ashcroft would cost $\$0.67 \times 132\% = \$0.884$, leaving $0.116 for interest charges. To take this traffic to Squamish would cost $\$0.67 \times 137\% = \$0.918$, leaving $0.082 for interest charges. This is on the basis of assuming a very low operating ratio for the Grand Trunk Pacific Railway. You can see that if a higher ratio was assumed, say 75 per cent., which is low for a road handling grain traffic, which usually carries a very low rate, then when the Grand Trunk Pacific Railway would spend $1 they would have a profit of $0.25, but the other two lines would have to spend respectively $0.99 and $1.028 to earn a dollar. It naturally follows that if the junction is made at Vanderhoof there is no possible hope of the traffic going via the southern routes. There is a further objection to the Squamish route—namely, that I have assumed that if this traffic develops to an amount that would warrant the construction of the line, the Government would build elevators at Squamish; this, I presume, would be more strenuously opposed by Vancouver business interests than the construction of elevators at Prince Rupert. Another feature adverse to the southern routes that has not been mentioned nor taken into account in the calculations is that, in calculating operating expenses, light loading, east and north bound, was assumed on the Grand Trunk Pacific Railway as well as on the Pacific Great Eastern Railway, but this would not work out that way in practice. If the grain business developed at Prince Rupert the Canadian National Railway could expect some east-bound traffic to develop, but the Pacific Great Eastern Railway can never expect to get any amount of east-bound through business out of either Vancouver or Squamish. (For more detailed information and figures *see* Appendix No. 3.)

M.—SHOULD THE LINE FROM QUESNEL TO PRINCE GEORGE BE COMPLETED AND PUT IN OPERATION?

It is estimated that to complete this line and acquire sufficient rolling-stock to meet the operating requirements will cost $2,000,000. There are about 45 miles of track to lay, some 70 miles will have to be ballasted, and about 8,000,000 feet B.M. of timber trestles to be erected. Most of this timber is on the ground, the exception being some 840,000 feet B.M. in stringers. The Cottonwood Viaduct remains to be erected with the foundations; the steel is nearly all purchased and fabricated at Walkerville, Ontario. The material for the floor system is not as yet purchased. Both the operating and fixed charges will be increased, and the question to be decided is, will the added revenue meet the additional fixed charges, amounting to at least $100,000 per year, and the additional operating charges? Taken on the basis of the company's experience in 1921, on the balance of the road the additional operating charges would not be less than $200,000, thus increasing the expenses by $300,000, without taking into account any additional charges, if the Pacific Great Eastern Railway should operate over the Fraser River Bridge on the Grand Trunk Pacific into Prince George, for interest on the cost of this bridge, or any additional operating expense for wheelage and terminal expense. The territory between Quesnel and Prince George is not developed to produce any traffic of any account to support or justify the building of a railway. As has been pointed out under previous headings, the possibility of the Pacific Great Eastern Railway getting any through traffic is so remote, and, further, as has been indicated, if it did get any such traffic, the cost of handling same over the Pacific Great Eastern Railway would equal, if not exceed, the revenue paid on such traffic. Therefore the question narrows down to what local business and what Vancouver business the Pacific Great Eastern Railway can get out of Prince George. The average total revenue from Prince George

during the past three years (after deducting what the Pacific Great Eastern paid on construction material for their road) will not pay two-thirds of the added expense. The Pacific Great Eastern Railway could not expect to get a third of this revenue. Therefore, instead of this extension being an aid, it would be a further burden on the railway and Province. I recommend that the road from Quesnel to Prince George be abandoned at once and the track taken up and salvaged. There may be a market for some of the viaduct at Walkerville. The track steel and fastenings with some of the ties could be salvaged, and it might be possible to realize from $250,000 to $350,000 from this source.

N.—WAS THE WORK CARRIED OUT SINCE THE GOVERNMENT TOOK CHARGE ECONOMICALLY PERFORMED?

To answer this question fully would require a detailed study away beyond the scope of my investigation. As the work was performed on a cost plus percentage basis, it would involve an investigation of the methods and organization in detail of the contractor's operations. I would not be justified in undertaking such an extensive detailed investigation without further instructions, and I cannot see any object to be gained by going further into this matter, other than to state that I do not believe that the cost plus percentage basis is an economical method of performing work unless you can introduce into the contract a bonus clause that will act as an incentive to the contractor to keep the cost of the work down. No matter how honest or efficient your contractors may be, the foremen and the labourers will not work efficiently when they have the idea that the more the work costs the more the contractor will make, and the less they will do the more work there will be. In the case of the Pacific Great Eastern Railway contract this feature was taken care of by the contractors submitting a schedule of the estimated cost of the work. With an undertaking that the sum on which a percentage would be paid would not exceed the sum the work would cost if figured at the unit prices in the schedule, and a further stipulation that if the actual cost of the work was less than what the work would have cost, figured at the schedule price, then the contractor was to receive as a bonus 25 per cent. of such saving in addition to their agreed percentage on the cost. This agreement, coupled with the fact that the company engaged a firm of contractors with a national reputation, would indicate that the work should be performed as economically as it was possible to do the work in 1919 and 1920, when prices were uncertain and wages at the highest point they have ever reached and the efficiency of labour at the lowest ebb in our time. Under such conditions it would have been impossible to do work under any plan that would be considered economical. If you had decided to have the work done on straight unit prices, I believe the contractors, to protect themselves, would have tendered a figure so high that the work would have cost even more than it did under the plan adopted by the company. If there is any criticism to make on the action of the Government management it would be for proceeding with the work when construction costs were from 50 to 100 per cent. higher than normal, and when the rates paid for money was at least 25 per cent. higher than normal, and at a time when practically all other industrial expansion was at a standstill.

O.—WERE DECREASES AND INCREASES IN UNIT PRICES OF ORIGINAL CONTRACT JUSTIFIED?

I do not believe in the principle of altering the terms of a contract, for the reason that if the possibility of changes in conditions of a contract becomes public, the result is that irresponsible contractors will take all kinds of chances in order to get work, depending on their being protected against loss by their ability to get changes in the contract. In this particular case there were many extenuating circumstances. In the first place, the schedule of prices was only an estimate of cost on which the percentage and possible bonus was based. Second, the original schedule was for a considerably less amount of work than what was finally accomplished under the original agreement. Third, in the spring of 1919, when the first reduction was made, it was generally believed at that time that the peak of high prices had been reached. The first of these reasons does not seem to be fully understood; as a matter of fact, the contract itself is a unit price form, and it is only by a study of the tender attached to the contract that one can determine the type of contract as between a unit price contract and a cost plus percentage contract. There is no doubt whatever as to the class of contract; it is a cost plus percentage contract with a bonus clause, and some criticism in the Legislature to the effect that the con-

tractors were paid some $700,000 more than they were entitled to by the original agreement is not a fact. The increase in unit prices in 1920 for percentage purposes had this effect: Under that schedule the work estimated by the engineers' figures at the increased prices increased the total on which a percentage of 5½ per cent. was calculated by $644,335.44, thus increasing the amount the company paid the contractors by $35,434.45, and up to date the cost of the work to the contractors has been some $300,000 greater than the engineers' estimate of the work computed at the revised unit prices; therefore, to date, the question of bonus has not entered into the question. Another criticism was that the head contractors let the work to stationmen and small contractors at prices less than the schedule in force at the time. This practice was perfectly justified and a most economical method. In the spring of 1919, when prices began to drop, it certainly looked like good business to reduce the schedule prices on which a bonus would be calculated, and the company had an opportunity of doing this when they were ordering more work under the original agreement; however, having made this reduction in 1919, when prices rose in 1920 the only logical action the company could take was to follow the precedent they had themselves established. The results so far are as follows: The lowering of the schedule in 1919 lowered the amount on which percentage was calculated by $16,924.46, making a saving to the company of $930.85. The net loss to the Government to date on account of change in schedule is $34,503.60. How these changes in schedule will affect the bonus is yet to be determined, while the cost of work performed to December 31st, 1921, is some $300,000 greater than the amount of the engineers' estimates. Multiplied by the schedule prices, the crediting of stores on hand and the final estimate may very materially affect these figures. The present information at hand is not sufficient to warrant my passing an opinion as to whether or not there should be any bonus under the terms of the agreement. I may suggest that on account of the nature of some of the work, cleaning out mud-slides, etc., where the cost is out of all proportion to quantities handled at usual unit prices. The cost in such cases might be the controlling factor rather than measurements in estimating amount of material moved; the Government would be well advised to carefully look into these features before paying any bonus on this contract.

P.—ADVISABILITY OF GETTING ONE OF THE LARGER RAILWAY COMPANIES TO OPERATE THE LINE.

It has been suggested that one of the larger connecting lines might be induced to take over the Pacific Great Eastern Railway on account of the advantage of having it as a feeder to their main lines. The reason given to the people of British Columbia for the Government aiding and guaranteeing the bonds, both as to principal and interest, of the Pacific Great Eastern Railway is contained in the first paragraph of Schedule A, attached to chapter 34, February 27th, 1912, and ratified by said Statute: "Whereas the Government of the Province of British Columbia deems it in the public interest to aid in the construction of the line of railway hereinafter mentioned, *for the purpose of securing to the people of British Columbia reasonable passenger and freight rates* and to assist in the opening-up and development of the Province." It is very doubtful if this was the real reason. One would not expect a city with three or four first-class hotels, with business not sufficient to keep one busy, to guarantee bonds for the purpose of building a second-rate hotel in order to improve hotel service or rates. It would appear more logical to suppose that business interests in Vancouver and Victoria for selfish reasons, aided by the Grand Trunk Pacific influence, was the real force that brought about the Pacific Great Eastern Railway. The Grand Trunk Pacific Railway Company might be expected to favour a rail connection with Vancouver, providing the same was constructed at the expense of some other party and such a connection would have some value to that company, but now that the Grand Trunk Pacific Railway and one of its chief competitors, the Canadian Northern Railway, have been made one under the management of the Canadian National Railway, the Pacific Great Eastern Railway is of no value to the system, other than a feeder to the extent that it may collect traffic from local inland points. The road has no strategic advantages, excepting the possibility that if the craze for building railways should ever demand an Alaskan rail connection, and the possibility of the Pacific Great Eastern Railway becoming a link in the system, therefore it cannot hope to get from a larger road more than the value of the Pacific Great Eastern Railway as a collector of traffic. A railway company that would investigate this matter will find that in 1921 about 36,000 tons of freight was the total of inward and forwarded from Vancouver for this road. They would naturally investigate and say, how much of this can

we get and how far can we haul it and at what rates? If we assume that the entire 36,000 tons would be hauled the average distance for traffic on the larger roads, say 450 miles, and that the rate received would be 25 per cent. greater than the average rate per ton-mile, say 1.5 cents, then the 16,200,000 ton-miles this traffic would make on the above assumptions would bring in a revenue of $243,000, a sum less than two-thirds the deficit in the cost of operating the Pacific Great Eastern in 1921; that is, if one of the other roads operated the Pacific Great Eastern Railway at the same expense as the company, and received, in addition to what was paid to the Pacific Great Eastern Railway, $243,000, there would still be over $120,000 loss in operating the Pacific Great Eastern Railway plus the cost of hauling the traffic 450 miles over its own rails, plus a fair proportion of interest on its own plant. There are thousands of miles of railways in Canada where the total receipts from traffic, both in and out, will not pay operating expenses of the line plus interest on cost, leaving nothing to pay for the hauling of the traffic over the main lines or foreign lines. But in the case of the Pacific Great Eastern Railway the present revenue from traffic in and out will not pay operating expenses of the Pacific Great Eastern Railway, to say nothing about interest on plant or cost of hauling traffic over foreign lines. It has been suggested that the Pacific Great Eastern Railway might build extensions. I have been driven over some of the proposed lines, and if they are built they will be a further burden to the Pacific Great Eastern Railway Company, for the reason that the total receipts with ten times the present development will not pay interest on the cost of these proposed lines, leaving nothing for the cost of operating the branch or hauling the traffic over the main line or foreign lines.

Q.—ADVICE AS TO WHAT SHOULD BE DONE TO ENABLE LINE TO MEET CHARGES IN THE NEAR FUTURE.

The present development of the country makes this desirable result an absolute impossibility. There is nothing in sight at the present time to indicate that this can ever be accomplished. It certainly cannot be done if the present method of financing is followed; that is, charging to capital the accrued interest and deficit in operating expenses. The interest charges will increase faster than the business. *See* Table No. 3, page 21, for two studies on this subject, both based on assumptions more favourable than present conditions would justify. The results show that in either case the total indebtedness at the end of ten years will be nearly doubled, without taking into account the extra expenditure that would be necessary to purchase sufficient new equipment to handle a greatly increased business. It will make very little difference what suggestions or what recommendations I may make, the Government of British Columbia must give the people of that Province what the majority think they want. Nevertheless, I will not shirk the responsibility of making some suggestions:—

First: The construction of the line between Vancouver and Squamish cannot be justified on any ground; therefore I would suggest that some readjustment of agreements be made with the municipalities on the North Shore that may have granted concessions in the matter of right-of-way and stop operating this section at once. Either hold the property or sell it to some private corporation. There can be very little doubt but that Vancouver will be one of the greatest cities in Canada and that something will be realized from this portion of the property. My personal opinion is that this property is more valuable to a private corporation than to the British Columbia Government, and that the Government should realize on the same as soon as they could remove any obligations that may exist which tends to depreciate the value of the property as a revenue-producer.

Second: Under no consideration, as conditions are at present, should the company undertake any construction north of the Grand Trunk Pacific Railway: First, because there is no development to justify the building of such lines; and, second, if such lines were built, the Pacific Great Eastern Railway would not get the business, and if they did, could not haul same over heavy grade at a profit at rates competition would force them to accept.

Third: Abandon the line from Quesnel to Prince George and salvage everything that can be sold.

Fourth: Do as hundreds of other small roads are doing on the continent. Abandon the operation of steam-trains for passenger and express business requiring five men to a train and replace same by gas-driven motor-cars, which are being developed to a high degree of perfection and require only one or two men to operate and require less than one-fifth of the fuel. To raise

money for the necessary expenditure, sell some of the locomotives now owned by the company, cancel mail contracts for the winter months, and close down that portion of the line where snow trouble occurs during the winter months. Operate a freight-train as often as there is business to warrant during the summer months, be that one a fortnight or one a month. Do not send out an engine unless there is a full load at least in one direction. Raise rates, both passenger and freight, to all the traffic will bear; that is, meet competition. Stop hauling freight at less than cost, to say nothing of paying interest charges. Encourage development as much as possible by giving commodity rates to low-grade freight as long as it can bear a rate slightly above cost. Any other action is not just to taxpayers of British Columbia. They have been obliged to pay the interest on the cost of this plant, and they should not be taxed to maintain a service for the people adjacent to the Pacific Great Eastern Railway that these people are unwilling or unable to pay for themselves. Abandon the operation of the line between Dragon Lake and Quesnel, unless the municipalities north of that point who may be interested will pay each year the cost of maintaining the line from Dragon Lake to Quesnel in excess of $1,250 per mile of main line. This is only justice to the other patrons of the road and to the taxpayers of British Columbia. If these suggestions are carried out the road should do better than paying operating expenses, for a few years at least, until such time as heavy renewals or replacements will be required.

Fifth: If the fourth suggestion on any modification, if same be put in force, that the company engineers keep in mind the possibility of abandoning the entire line south of Clinton, if a sufficient saving can be made in operating expenses to pay the interest on the construction cost of the line from Clinton to Ashcroft, less the value of the salvage of the line south of Clinton. Study the possibility of selling the south end of the line to the lumber interests. They cannot object to the abandonment of the line unless they are willing to pay more than the salvage value of the line and operate the same for their own use as they see fit.

Sixth: That the Province does not guarantee any more bonds, either as to principal or interest, for the construction of branch lines; if such lines are demanded to develop resources of any section, then let the owners of these resources, be they owned either privately or by the Government, give to the railway company an interest in the resources, which they may in turn pledge as security for the money with which to construct the lines. If money cannot be raised in this manner the line should not be constructed.

Seventh: If the people of British Columbia are not prepared to continue paying from $2,000,000 to $2,500,000 per year on the investment already made and what will be necessary in the next ten years, that the company be ordered at once to abandon the whole system and recover what salvage is possible, and in this way slightly reduce the liability and also prevent any further increase in their obligations.

In conclusion, I wish to thank you, sir, for facilitating my efforts to obtain all the facts bearing on this study. I also wish to express my appreciation for the courtesies and assistance rendered by the officers and engineers of the Pacific Great Eastern Railway.

Yours truly,
J. G. SULLIVAN.

TABLE No. 3.

Possible operating results for ten years, assuming that the line to Prince George would be completed during 1922 at a cost of $2,000,000 capital expenditure for construction and extra equipment; further assuming the operation income for 1922 would show an increase of 10 per cent. over that for 1921 and the operating expenses an increase of only 5 per cent., that in the year 1923 the income would increase by 300 per cent. and the operating expense by only 33⅓ per cent., and that for succeeding years the revenue would annually increase 10 per cent. and the expenses only increase 5 per cent. until operating expenses reached 75 per cent. of income.

Year.	Interest Charges as of 1921.	Revenue.	Expense.	Surplus or Deficit.	Interest on Deficit at 5 %.	Total Loss for Year.	Total Loss on which 5 % Interest is paid.	Remarks.
1921	$1,911,913 14	$ 383,389 51	$ 751,931 53	−$368,542 02	.....	$2,280,455 16	$ 2,280,455 16	
1922	1,911,913 14	422,000 00	788,000 00	− 366,000 00	$ 114,022 76	2,391,935 90	{ 2,000,000 00 / 4,672,391 06 }	New capital.
1923	1,911,913 14	1,266,000 00	1,051,000 00	+ 215,000 00	333,619 55	2,030,532 69	8,702,923 75	
1924	1,911,913 14	1,393,000 00	1,103,000 00	+ 290,000 00	435,146 19	2,057,059 33	10,759,983 08	
1925	1,911,913 14	1,532,000 00	1,158,000 00	+ 374,000 00	537,999 15	2,075,912 29	12,835,895 37	
1926	1,911,913 14	1,685,000 00	1,266,000 00	+ 419,000 00	641,794 77	2,134,710 91	14,970,606 28	
1927	1,911,913 14	1,854,000 00	1,390,000 00	+ 464,000 00	748,530 31	2,196,443 45	17,167,049 73	Operating expense, 75 % of income.
1928	1,911,913 14	2,039,000 00	1,529,000 00	+ 510,000 00	858,352 49	2,260,265 63	19,427,315 36	
1929	1,911,913 14	2,243,000 00	1,682,000 00	+ 561,000 00	971,365 76	2,322,278 90	21,749,594 26	
1930	1,911,913 14	2,467,000 00	1,850,000 00	+ 617,000 00	1,087,479 71	2,382,392 85	24,131,987 11	
1931	1,911,913 14	2,714,000 00	2,036,000 00	+ 678,000 00	1,206,599 35	2,440,512 49	26,572,499 60	Total annual interest charges, 1931, $3,118,512 49.

Table similar to above, but deducting operating results of North Shore line and assuming that operating income for 1923 would increase 500 per cent., and that, commencing 1923, $1,000,000 a year new capital must be provided to replace wooden structures, and further assuming that North Shore should carry interest on $1,270,000 of bonds, assuming an operating ratio of 67 per cent.

Year ending	Interest Charges as of Dec. 31, 1921.	Revenue.	Expense.	Surplus or Deficit.	Interest on Deficit at 5 %.	Total Loss for Year.	Total Loss on which 5 % Interest is paid.	New Capital, etc.	Remarks.
Dec. 31, 1921	$1,854,763 14	$ 314,325 72	$653,797 88	−$ 339,472 16	.....	$2,194,235 00	$ 2,194,235 00	.....	
" 1922	1,854,763 14	346,000 00	687,000 00	− 341,000 00	$ 109,712 00	2,305,475 00	6,499,710 00	$2,000,000	Completing work.
" 1923	1,854,763 14	1,730,000 00		+ 577,000 00	324,985 00	1,602,748 00	9,102,458 00	1,000,000	Making bridges and culverts permanent.
" 1924	1,854,763 14	1,903,000 00		+ 634,000 00	455,123 00	1,675,886 00	11,778,344 00	1,000,000	
" 1925	1,854,763 14	2,093,000 00		+ 698,000 00	588,917 00	1,745,680 00	14,524,024 00	1,000,000	
" 1926	1,854,763 14	2,302,000 00		+ 767,000 00	726,201 00	1,813,964 00	17,337,988 00	1,000,000	
" 1927	1,854,763 14	2,532,000 00	Expense ⅔ of revenue	+ 844,000 00	866,899 00	1,877,662 00	20,215,650 00	1,000,000	
" 1928	1,854,763 14	2,785,000 00		+ 928,000 00	1,010,782 00	1,937,545 00	23,153,195 00	1,000,000	
" 1929	1,854,763 14	3,063,000 00		+ 1,021,000 00	1,157,660 00	1,991,423 00	26,144,618 00	1,000,000	
" 1930	1,854,763 14	3,369,000 00		+ 1,123,000 00	1,307,231 00	2,038,994 00	29,183,612 00	1,000,000	
" 1931	1,854,763 14	3,706,000 00		+ 1,235,000 00	1,459,181 00	2,078,944 00	31,262,556 00	.....	
					$1,563,128 00				
					1,854,763 00				
					$3,417,891 00	fixed charges	end of 1931.		

APPENDICES.

APPENDIX No. 1.

ECONOMICS OF PROPOSED CHANGE OF LINE AT CROSSING OF COTTONWOOD RIVER.

An economical plant is one where the interest charges plus operating expenses are a minimum.

The principal operating expenses of a railway that are affected by short changes of line are usually wages of train and engine crews, controlled by distance; fuel-consumption, controlled by engine-miles and work performed; maintenance-of-way, controlled by distance and special conditions, and structure also by curvature; maintenance of equipment, controlled by distance and curvature. Rate of grade, which, if the ruling grade of the division is changed, would affect the train-loading for the entire division.

In this particular case the temporary grades introduced to facilitate and hasten the completion of the grading south of Cottonwood River have not been taken as ruling. They can be easily eliminated whenever the traffic will justify the necessary small expense. Fuel-consumption is controlled by the engine-miles run plus the work performed by the locomotive. This work consists of overcoming friction, which for fully loaded freight-cars amounts to 4 lb. per ton in summer-time on level track to twice that amount in zero weather. For empty cars these figures are doubled. In this case I assumed that the average resistance per ton would be 6.8 lb.; that is equivalent to the resistance of a 0.34 per cent. grade, or the work done in hauling a train over 1 mile of level track is equivalent to lifting the entire train a distance of 18 feet. The work done in overcoming a degree of curvature is taken as the equivalent of lifting the train 0.04 foot. The lifting of 1,000 tons 1 foot is the equivalent of 1 horse-power hour. From a very extended study of this matter we calculate that 3.5 lb. of ordinary coal is consumed in performing 1 horse-power hour of work. We also calculate that the large Pacific Great Eastern Railway locomotive will consume 80 lb. of coal per mile run in keeping up steam, running the locomotive, and wasted while standing on side-tracks, running downhill, etc. The maintenance-of-way will cost a certain sum plus a variable depending on the amount of traffic, but in this case we have assumed the conservative sum of $2,400 per mile for both maintenance-of-way and maintenance of equipment. Train and engine crew wages taken at $0.30 per mile.

The favourable economic features of the line adopted by the Government engineers consist of a saving of 5 miles in distance and 137 feet in rise and 1,103° less curvature. In addition, there is the saving of the cost of 4,700,000 lb. extra steel required in the crossing of the river on the line located by the company engineers, in addition to the cost of 5 miles track material, etc.

Data from profiles and personal examination and based on the assumption that the traffic over this portion of the line would be carried at a rate of 2 cents per ton-mile, and that the cost of operating would not exceed a ratio of 75 per cent., which would mean a profit of 0.5 cent per ton-mile. As this railway was costing nearly $100,000 per mile to construct and equip, and as the diversion was estimated to cost considerably more than this sum per mile on account of the expensive crossing of the Cottonwood Creek, before the construction of the line could be justified it must have been assumed that the railway would earn at least $5,000 (interest at 5 per cent. on $100,000) per mile of road in addition to operating expenses; and, further, to be on the conservative side, we will assume that $1,000 per mile of this interest charge would come from profit of passenger business, that would leave to be earned from profit on freight business $4,000 per mile of track. This sum divided by one-half of 1 cent equals 800,000 tons of pay-freight per year over this portion of the road to pay expenses. On the assumptions made above, from the nature of the country and conditions obtaining, the majority of this freight would be south-bound; but assuming that it was balanced in both directions, and as an offset assuming that the tare and light cars and O.C.S. traffic, such as fuel, etc., would amount to 100 per cent. of the pay-load, that would mean an annual gross tonnage of 1,600,000 tons, or 4,380 gross tons per day.

To haul this tonnage would require at least four trains; that is, two trains in each direction.

To make $1,000 profit per mile per year from passenger business would require at least one passenger-train per day in each direction; that is, two daily passenger-trains or a total of freight

and passenger of six daily trains as a minimum number that would justify the construction of the railway. A study of the profiles show that the diversion made the following saving in the factors that affect the economics of railway operation:—

	Equivalent Rises. Feet.
Distance, a saving of 5 miles at 18 feet	90
Rise and fall, a saving of 137 feet	137
Curvature, a saving of 1,103° at .04 foot	44
Total extra resistance	271

Steel structures, 4,700,000 lb. extra steel viaduct.

The above affects operations as follows: Assuming passenger annual tonnage 400,000 tons, the total annual tonnage would be 2,000,000 tons.

COAL-CONSUMPTION PER YEAR.

$\frac{2{,}000 \times 271' \times 3.5 \text{ lb.} \times \$8.00}{2{,}000 \text{ lb. in ton}}$	$ 7,588 00
Engine-mileage, $\frac{365 \times 6 \times 5 \times 80 \text{ lb.} \times \$8.00}{2{,}000 \text{ lb.}}$	3,504 00
Engine and train wages, $365 \times 6 \times 5 \times \$30.00$	3,285 00
Ordinary maintenance-of-way and maintenance equipment, account of extra 5 miles per year	12,000 00
Extra maintenance on large viaducts, 2 per cent. on $275,000	5,400 00
Calculated annual saving in operation	$31,777 00

In addition to the saving in operation, there must be taken into account the cost of regrading the old line, cost of track-laying, ballasting, as well as the cost of track material, for 5 miles of extra line; also cost of 5 miles of extra fencing and telephone-line; also the extra cost of the larger steel viaduct. The details of these items are as follows:—

Mile 22.5 to Mile 23.5, old line, developed into a continuous slide over which it would be impossible to construct a permanent line. The only way a railway could be carried over this mile would be to trestle, and during the spring break-up for three or four months to keep repair-gangs maintaining this trestle.

A very conservative estimated cost of construction with the capitalized cost of maintaining would be	$ 100,000 00
Estimated cost of regrading balance of abandoned line	100,000 00
Cost of 5 miles, 60-lb. steel and fastenings at $6,300	31,500 00
Cost of 15,000 track-ties at 78 cents	11,700 00
Cost of 5 miles track-laying at $1,255	6,275 00
Cost of 5 miles ballasting at $1,500	7,500 00
Cost of 5 miles telephone-line at $530	2,650 00
Cost of 5 miles double fence-line at $1,140	5,700 00
Extra steel, 3,250,000 lb. at 11.44 cents	371,800 00
Cost of hauling same from Victoria	6,400 00
Extra deck-timber, 192,000 feet B.M. at $100	19,200 00
Large south approach would have to be eventually replaced by steel structure, amounting to 1,300,000 lb. steel at 8 cents	104,000 00
1,560 cubic yards masonry at $25	39,000 00
Deck-timber, 213,000 feet B.M. at $70	14,110 00
Total	$ 819,835 00
Capitalized value of annual saving in operation is $31,777 at 5 per cent.	635,540 00
Total extra expense warranted in making change	$1,455,375 00

The cost of trestles that were to be built on both lines would balance each other. The grading of the proposed line at enormous cost, being done by men working on force account at the peak of the high prices when men were the least efficient, was $1,066,266.08, showing that

if the building of the railway was justified there is no doubt that the Cottonwood diversion was fully justified. It has been claimed that the ruling south-bound grade of 75 per cent. of the old line has been changed. This is not a fact; it is true that temporary grade of 1.2 per cent. has been introduced for very short distances on 3 miles of the diversion, but the line was located on a 0.75 per cent. south-bound maximum grade and the extra grading necessary to make 0.75 per cent. grade permanent would not amount to over $50,000 even at present high prices.

APPENDIX No. 2.

ECONOMICS OF QUESNEL CHANGE, USING SAME FACTORS AS MENTIONED IN APPENDIX No. 1.

To complete grading on old line and bridge, Quesnel River, would require the removal of 150,000 cubic yards of material, and the crossing of the old line would require an excess of 300,000 lb. steel, an excess of 4,700 cubic yards concrete, and an excess of 273,000 cubic yards train-fill material.

An adverse item is an excess of timber trestle on the new line, amounting to excess trestle timber, 470,000 feet B.M.; excess piling, lineal feet piling, 13,500 feet; excess iron, 27,000 lb.

Economics for six daily trains and total annual tonnage of 2,000,000 gross tons.

Figuring train- and engine-crew wages at 30 cents per train-mile, and estimating maintenance of equipment at $2,400 per mile, it works out, after deducting the adverse coal-consumption, to an annual saving of $2,721 per year. This capitalized at 5 per cent. amounts to $54,420.

ECONOMIC AND CONSTRUCTION COST.

	In Favour of New Line.	In Favour of Old Line.
Capitalized value of saving in operation	$ 54,420 00	.....
150,000 cubic yards grading old line at $1	150,000 00	.....
4,700 cubic yards concrete at $29	86,900 00	.....
273,000 cubic yards train-fill at $50	136,500 00	.....
Value of track material, track-laying, and ballasting	11,395 00	.....
470,000 feet B.M. trestle at $75	.....	$ 35,250 00
13,500 lineal feet piling at 50 cents	.....	6,750 00
27,000 lb. iron in trestles, 8.10	.....	2,700 00
Grading of new line	.....	816,328 82
Totals	$439,215 00	$861,028 82

This balance in favour of the old line would require an extra annual revenue of $21,090 from Quesnel without extra operating expense to justify the expenditure.

APPENDIX No. 3.

To be able to judge of the comparative operating economics of various lines, one must know the amount of work that has to be performed, as well as the distance and the rates of grade which control the train-loading. This is in addition to the special features and conditions that may make operation more expensive in one case than in another. In Appendix No. 1 it was explained how fuel-consumption is calculated, and in order to be able to estimate approximately the comparative operating costs on various routes I have made a very extensive study of the detailed profiles of the Grand Trunk Pacific Railway from Prince George to Prince Rupert, those of the Pacific Great Eastern Railway from Prince George to Squamish and to Ashcroft via Clinton, and those of the Canadian National Railway, Ashcroft to Vancouver. The results of these studies are shown in Table No. 1.

In making any study of this kind it is necessary to make some assumptions, and in this case I assume that north-bound traffic on the Pacific Great Eastern Railway would not require the loading of cars to more than one-third capacity. On this assumption I calculated that the frictional resistance against south-bound traffic would be 6.4 lb. per gross ton, or equivalent to

raising the train 17 feet as the resistance for each mile of level track. For north-bound traffic I calculated that the resistance would be 7.5 lb. per gross ton, or the equivalent to lifting the train 20 feet for each mile of resistance. These figures were used on all routes in making the comparison. I assumed that the largest type of engine on the Pacific Great Eastern Railway was within 15 per cent. of the limit that the standard of construction on that road would permit, and the locomotives on either the Grand Trunk Pacific Railway or the Canadian National Railway would be one-third heavier and consequently capable of handling one-third greater load on the same grade. Then, for comparative purposes, I calculated how many train-miles and engine-pusher miles would be required to take over the various routes a full load for such a locomotive for an 0.4 per cent. grade. This information is found in Table No. 2.

In arriving at these figures the Pacific Great Eastern Railway was given every advantage; for instance, on account of the light loading N.B. it was assumed that only 60 per cent. of the N.B. trains would use pushers, while we know that in practice pushers are generally used on all freight-trains on a 2.2 per cent. grade even if the load is not up to the limit. Also in calculating the train-miles between Clinton and Ashcroft the N.B. load of light cars was taken as the controlling factor, thus making a turn round at Clinton for some trains from Williams Lake. This is not generally done in actual practice.

In order to eliminate as far as possible inaccuracies that might exist by using present-day prices either for fuel or wages, the comparison is made on a percentage basis, based on the controlling facts. For instance, train-crew and engine-crew wages are almost directly proportional to the train and engine mileage. The other items, such as preparatory time and overtime, would probably be in about the same proportion; therefore the cost of these items are based on the train and engine mileages. Fuel-consumption is based on engine-miles plus work done, and the work done is in direct proportion to the resistance calculated from the profiles and show as the total resistance. The comparative cost of fuel is made on the basis of engine-miles and resistance, calculating that the larger locomotives on the Canadian National Railway and Grand Trunk Pacific Railway will use 7 per cent. more fuel in keeping up steam, etc., than the smaller Pacific Great Eastern Railway locomotives.

The maintenance-of-way is based on more uncertain factors. If both roads were of the same class of construction and used the same grades and about the same class of country, the comparative cost would be on a mileage basis plus a factor for curvature. As a matter of fact, the mileage was given more precedence than the facts would warrant. Note that while the comparative cost of Ashcroft route is calculated at 127 per cent. of the Prince Rupert–Prince George route, that Prince George to Squamish is only 115 per cent. The engineers who are familiar with these routes will, I believe, say that on account of all the heavy trestles, heavy grades, snow troubles, and heavy curvature south of Clinton, this latter line, although shorter, will probably cost more to maintain than the Ashcroft line. In the matter of maintenance of equipment this item is controlled by the number of engines and car-miles, also by curvature and grades to a certain extent. In making the comparison it was calculated that repairs to larger Grand Trunk Pacific Railway and Canadian National Railway locomotives would cost 20 per cent. more per mile run than the smaller Pacific Great Eastern Railway locomotives.

Having made a comparison of the various items on a percentage basis, then these percentages were applied to total operating cost in the summation. It may be said that the Pacific Great Eastern Railway's present operating costs are not in the proportions given—namely, 25 per cent. for maintenance-of-way and maintenance of equipment, 9 per cent. train and engine wages, 12.5 per cent. fuel, and 28.5 per cent. other items; but it is believed that these percentages are not far from the facts on a road doing much business. It must be remembered that this study is made on the assumption that the Pacific Great Eastern Railway would have to handle considerable business, and it must be remembered that maintenance of equipment, fuel, train and engine wages all go up faster with business than maintenance-of-way, and that the present ratio of percentages of these items on the Pacific Great Eastern Railway is not a representative figure.

TABLE No. 1.

A study of comparative resistance on various lines by calculation of work done, reduced to equivalent in rise. In calculating frictional resistance, the resistance of a fully loaded train for 1 mile of level track south- or west-bound is assumed equivalent to a vertical lift of 17 feet; for a partially loaded north- or east-bound train the same resistance is assumed as 20 feet.

Mile.		Elevation.	Curvature.	Grade.	Resistance, North-bound.				Resistance, South-bound.				Notes.
From	To				Friction.	Rise.	Curvature.	Total.	Friction.	Rise.	Curvature.	Total.	
		110			*Squamish Division, P.G.E. Rly.*								
			Degrees.										
0.0	5.5	125	335	Level	110	15	13	138	93	−15	13	91	
5.5	13.0	314	335	1 per cent. N.B.	150	189	13	352	....	....	....	*Nil*	
13 0	36.0	2,181	3,884	2.2 per cent. N.B.	460	1,867	155	2,482	....	....	....	*Nil*	
36.0	42.5	2,181	826	Level	130	....	33	163	110	....	33	143	
42.5	57.5	794	2,698	2.2 per cent. S.B.	....	....	....	*Nil*	255	1,387	108	1,750	
57.5	61.5	774	290	Light	80	−20	12	72	68	20	12	100	
61.5	75.0	1,714	1,927	2.1 per cent. N.B.	270	940	77	1,287	....	....	....	*Nil*	
75.0	86.0	987	1,479	2 per cent. S.B.	....	....	....	*Nil*	187	727	59	973	
86.0	90.0	1,010	832	Undulating	80	23	33	136	68	−23	33	78	
90.0	117.5	879	6,742	Undulating	550	−131	270	689	468	131	270	869	
117.5	120.0	790	195	1 per cent. S.B.	....	....	....	*Nil*	42	89	8	139	
120.0	121.85	840	251	1 per cent. N.B.	37	50	10	97	....	....	....	*Nil*	
0.0	121.85		19,794					5,416				4,143	Total.
		840			*Williams Lake Division, P.G.E. Rly.*								
0.0	34.0	3,609	7,460	2.2 per cent. N.B.	680	2,769	298	3,747	23	....	....	23	
34.0	44.5	3,275	956	0.75 per cent. S.B.	....	....	....	*Nil*	179	334	38	551	Junction, South Line.
Squamish	44.5		28,210					9,163				4,717	Total, Squamish to 44.5
0.0	44.5	3,275	8,416	.....	....	....	....	3,747	..	....	....	574	
44.5	45.0	3,266	89	0.75 per cent. S.B.	....	....	....	*Nil*	9	9	4	22	Clinton.
45.0	62.0	3,725	1,897	1 per cent. N.B.	340	459	76	875	....	....	....	*Nil*	
62.0	65.0	3,650	220	0.90 per cent. S.B.	....	....	....	*Nil*	51	75	9	135	
65.0	74.0	3,701	934	Undulating	180	51	37	268	153	−51	37	139	
74.0	80.0	3,930	556	1 per cent. N.B.	120	229	22	371	....	....	....	*Nil*	
80.0	85.0	3,965	319	Undulating	100	35	13	148	85	−35	13	63	
85.0	120.0	2,760	3,734	1 per cent. S.B.	....	....	....	*Nil*	595	1,205	149	1,949	
120.0	137.5	2,580	1,527	Undulating	350	−180	61	231	298	180	61	539	
137.5	152.0	1,973	2,068	1 per cent. S.B.	....	....	....	*Nil*	247	607	83	937	
152.0	156.0	S. 1,965 N. 1,916	371	Undulating	80	....	15	95	68	49	15	132	
0.0	156.0	1,916	20,131					5,735				4,490	Total.

		1,916		*Prince George Division, P.G.E. Rly.*									
			Degrees.										
0.0	6.0	2,094	798	1 per cent. N.B.	120	178	32	330	....	....	....	*Nil*	
6.0	9.0	2,125	219	Undulating	60	31	9	100	51	−31	9	29	
9.0	27.0	1,595	2,534	0.75 per cent. S.B.	....	....	....	*Nil*	306	530	101	937	
27.0	37.0	1,600	412	Undulating	200	5	16	221	170	−5	16	181	
37.0	39.0	1,650	165	0.7 per cent. N.B.	40	50	7	97	....	....	....	*Nil*	
39.0	45.5	1,825	283	0.1 per cent. N.B.	130	175	11	316	....	....	....	*Nil*	
45.5	48.5	1,727	167	0.75 per cent. S.B.	....	....	....	*Nil*	51	98	7	156	
48.5	56.5	1,860	281	0.1 per cent. N.B.	160	133	11	304	51	....	....	51	51-foot short rises.
56.5	63.5	1,758	169	Undulating	140	−102	7	45	119	102	7	228	
63.5	68.5	1,552	543	0.85 per cent S.B.	....	...	....	*Nil*	85	206	22	313	
68.5	70.5	1,552	286	Undulating	40	....	11	31	34	....	11	45	Quesnel.
70.5	80.0	2,330	1,405	2 per cent. N.B.	190	778	56	1,024	.. .	....	....	*Nil*	
80.0	82.0	2,368	81	Undulating	40	38	3	81	17		3	20	
82.0	87.5	2,205	581	0.75 per cent. S.B.	....	....	....	*Nil*	94	163	23	280	Temporary grades
87.5	98.5	2,205	1,415	Undulating	220	....	57	277	187	....	57	244	1.2 per cent.
98.5	110.0	1,960	674	0.75 per cent. S.B.	....	....	....	*Nil*	196	245	27	468	
110.0	116.0	2,208	603	1 per cent. N.B.	120	248	24	392	....	....	....	*Nil*	
116.0	118.5	2,229	447	Undulating	50	21	18	89	43	−21	18	40	
118.5	121.0	2,205	85	Undulating	50	−24	3	29	43	24	3	70	
121.0	125.5	2,120	456	Undulating	90	−85	18	23	77	85	18	180	
125.5	127.0	2,164	48	1 per cent. N.B.	30	44	2	76	....	....	....	*Nil*	
127.0	131.5	2,100	512	0.75 per cent. S.B.	....	....	....	*Nil*	77	64	20	161	
131.5	136.5	2,107	207	Undulating	100	7	8	115	85	−7	8	86	[tance.
136.5	149.5	1,873	502	0.75 per cent. S.B.	80	....	....	80	221	234	20	475	4 miles N.B. resis-
G.T.P. Rly.	1 mile	....	....	.....	20	....	....	20	17	...	....	17	G.T.P. Rly., 1 mile.
0.0	150.5		12,873					3,670				3,981	Prince George.
		3,277		*Clinton–Ashcroft Proposed Line.*									
0.0	45.8	991	6,343	1 % and 2.2 % N.B.	916	2,286	254	3,456	....	....	....	*Nil*	
		991		*Ashcroft–Vancouver C.N. Rly.*									
48.0	125.5	448	8,788	0.4 % max. undulating.	1,550	543	352	2,445	1,317	−543	352	1,126	Boston Bar.
0.0	131.8	9	7,543	0.4 % max. undulating.	2,636	439	302	3,377	2,241	−439	302	2,104	Vancouver.
209.3	miles		16,331					5,822				3,230	Total.
Prince George–Squamish, 428 5 miles			52,798	.....	....	....	....	14,821	....	....	....	12,614	
Prince George–Ashcroft, 307 miles			30,931	.....	....	....	....	9,114	....	....	....	7,897	
		9.0		*Prince Rupert to Prince George.*									
0.0	119.5	367.0	5,306	Level or light W.B. 0.4 per cent. E.B.	2,390	358	212	2,960	2,032	−358	212	1,886	Pacific.
119.5	226.5	1,616.0	7,174	Less 0.2 % W.B., 0.4 % E.B.	2,140	1,249	287	3,676	1,819	−1,249	287	857	Smithers.
226.5	351.5	2,237.0	4,231	0.3 % or less, W.B., 0.4 % E.B.	2,500	621	169	3,290	2,125	−621	169	1,673	Endako.
351.5	398.0	2,089.0	1,828	0.4 % W.B. Down or light E.B.	930	−148	73	855	790	148	73	1,011	Vanderhoof.
398.0	467.0	1,862.0	2,880	0.4 % E. and W.B.	1,380	−227	115	1,268	1,173	227	115	1,515	Prince George.
0.0	467.0		21,419					1,249				6,942	Pr. Rupert–Pr. George

TABLE No. 2.

Showing some of the more important economic features of various routes from Prince George, first, to Prince Rupert; second, to Vancouver via Ashcroft; third, to Squamish; and from Vanderhoof, first, to Prince Rupert; second, to Vancouver via Ashcroft; third, to Squamish; the object being to find out the possibilities of various routes from an economic point of view, to better judge the route that grain and other products from the Peace River country should take if a line were built from the Peace River District to either Vanderhoof or Prince George. Comparison is on a basis of a fully loaded-car train for 0.4 per cent. grade, 4,000 total gross tonnage south- and west-bound, 2,222 tons north- and east-bound.

Point to Point.	Mileage.	Pusher-engine Miles.	Train-mileage.	Total Engine-mileage.	Train and Engine Wages.	Fuel Consumption.	Total Resistance.		Total Curvature.	Maintenance of Way.	Maintenance of Equipment.
							E. and N. Bound.	S. and W. Bound.			
					Per Cent.	Per Cent.	Feet.	Feet.	Degrees.	Per Cent.	Per Cent.
Prince George–Prince Rupert	467	...	758	758	100.0	100	12,049	6,942	21,419	100	100
Prince George–Vancouver	517 (C.N.R. 209)	33	1,670	1,703 (C.N.R. 314)	222.5	160	14,936	11,127	47,262	127	127
Prince George–Squamish	428.5	151	2,112	2,263	288.6	180	14,821	12,614	52.798	115	125
Vanderhoof–Prince Rupert	398	...	620	620	100.0	100	10,781	5,427	18,539	100	100
Vanderhoof–Vancouver	586 (C.N.R., G.T.P. 278)	33	1,808	1,841 (C.N.R., G.T.P. 452)	294.3	211	16,204	12,642	50,142	167	167
Vanderhoof–Squamish	497.5 (G.T.P. 69)	151	2,250	(2,401 G.T.P. 138)	375.0	246	16,089	14,129	55,678	152	262

SUMMATION OF COMPARATIVE OPERATING EXPENSES ON VARIOUS LINES.

Point to Point.	Maintenance of Way.	Maintenance of Equipment.	Train Wages.	Fuel.	Other Items.	Total.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Prinee George–Prince Rupert	25.00	25.00	9.00	12.50	28.50	100.0
Prince George–Vancouver	31.75	31.75	20.00	20.00	28.50	132.0
Prince George–Squamish	28.75	31.25	26.00	22.50	28.50	137.0
Vanderhoof–Prince Rupert	25.00	25.00	9 00	12.50	28.50	100.0
Vanderhoof–Vancouver	41.75	41.75	26.50	26.40	28.50	164.9
Vanderhoof–Squamish	38.00	40.50	33.75	30.75	28.50	171.5

REPORT

ON THE

EXAMINATION OF NATURAL RESOURCES

TRIBUTARY TO THE LINE OF THE

PACIFIC GREAT EASTERN RAILWAY

BY

JOHN STOUGHTON DENNIS

THE GOVERNMENT OF
THE PROVINCE OF BRITISH COLUMBIA.

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1922.

Natural Resources Tributary to Pacific Great Eastern Railway.

By John Stoughton Dennis.

Montreal, Que., June 19th, 1922.

The Hon. John Oliver,
Premier, Victoria, B.C.

Sir,—In compliance with your request, I have completed an examination of the natural resources tributary to the line of the Pacific Great Eastern Railway, and beg to submit the following report with reference thereto:—

Leaving North Vancouver, I proceeded to the end of the short branch of the line at Whiteville (13 miles); thence by motor-boat 27 miles to Squamish, the present terminus of the railway-line. From the latter point I covered the whole of the line by gasolene track-motor to Quesnel (348.5 miles), and made side-trips by automobile up the Lillooet River in the Pemberton Valley, south from Lillooet in the Fraser Valley, and east from Exeter Station to Canim Lake, these trips comprising 92 miles in all.

I made the return journey from Quesnel by automobile and crossed to the west side of the Fraser River at Williams Lake, making an extended trip through the Chilcotin District via Riske Creek, Hanceville, and the Gang Ranch, reaching the Canadian Pacific Railway at Ashcroft, a total auto trip of 298 miles.

For convenience of reference in reporting on the natural resources tributary to the railway-line and the possibility of creating additional traffic as a result of their further development, I have divided the line into four sections, as follows:—

(1.) That portion from the terminus at Squamish to Lillooet (120.3 miles).
(2.) That portion from Lillooet to Williams Lake (157.5 miles).
(3.) That portion from Williams Lake to Quesnel (70.7 miles).
(4.) The unfinished portion of the line from Quesnel to Prince George (81.5 miles).

In reporting on each of the above sections it is proposed to deal with the natural resources tributary thereto under the special headings of:—

Agricultural Land.	Water-powers.
Timber Resources.	Tourist Resorts.
Mineral Resources.	Traffic Possibilities.

SECTION 1.—SQUAMISH TO LILLOOET.

Agricultural Land.

Beginning at Squamish, the line for some distance follows the valley of the Squamish, within which, adjacent to Squamish Village and further to the north and north-west, there are a few small farms. There is room for a number of additional settlers within this valley when additional land is cleared, and the soil and climate are suitable for all kinds of grain, fodder-crops, and small fruits. The district, however, is limited in extent, and, in any case, the grain, fruit, or cattle products will not provide any particular railway traffic, as what is not consumed locally will naturally be shipped from Squamish by water to Vancouver.

Leaving the Squamish Valley, the line ascends the Cheakamus River to the summit at Alta Lake, and thence following the waters flowing to the north to its intersection with the Lillooet River. Throughout this section there is practically no land available for agricultural development. The mountains are high, with steep slopes, and the country is heavily timbered with a very fine stand of merchantable timber, which is more particularly referred to hereafter under the heading of "Timber Resources," tributary to this section of the line. The Lillooet River is reached at Pemberton, and west and north-west of that point in the valley, including the Pemberton Meadows, for a distance of some 20 miles, an opportunity is afforded for considerable agricultural, stock-raising, dairying, and small-fruit production. There are a number of settlers already located in this valley, including a few returned soldiers located under the provisions of the Assisted Settlement Acts, and the existing evidences of soil, crops, and live stock justify the

statement that the present number could be at least doubled and the productiveness of the valley materially increased if certain colonization and development assistance were provided by the Government.

I motored up this valley from Pemberton, a distance of some 15 miles, and it is evident that the first and most pressing need is a good road and some permanent protection against the eroding banks of the river. The success of the present settlers and the chance of further agricultural development would be materially aided by the establishment of a creamery and a small jam-factory at Pemberton, and, in addition, some assistance should be given towards clearing land in the valley, both on existing farms and in many areas suitable for additional colonization. The timber on the bottom lands in the valley is not heavy and the cost per acre of clearing should not be prohibitive. It is quite clear from the evidence available on existing farms that clearing could be carried on within reasonable limits of expense and the resulting cleared areas would be highly suitable for settlement.

Leaving Pemberton at the crossing of the Lillooet River, the line ascends the Birkenhead River to the summit of the Cascade Mountains, and thence following certain tributary streams and lakes to the Fraser Valley at Lillooet. Between Pemberton and Birken Station at the summit of the Cascades the country is heavily timbered with a fine stand of merchantable timber, referred to in detail later on, and there are no tributary areas of agricultural land, except a few very small scattered areas already occupied, which can be further developed. From the summit of the Cascades, proceeding east and north, a district of semi-aridity is reached, within which the production of crops is only possible with the aid of irrigation, and there are no large agricultural areas adjacent to this portion of the land, with the exception of some small tracts at the south end of Anderson Lake, between Anderson and Seton Lakes, and at the eastern extremity of the latter. These small areas are now occupied and developed through the medium of small irrigation systems, and there does not seem to be any possibility of adding thereto, the slopes of the mountains being abrupt, and only in the bottoms of the narrow valleys is there any land which would justify clearing for occupancy.

At Lillooet the first large area of land suitable for agricultural development is met with. The district, which is practically all devoid of timber, covers the bottom lands and the first benches of the Fraser Valley for some distance north and south of Lillooet. An automobile trip was made for some 15 miles south from Lillooet for the purpose of inspecting the existing ranches, and while cultivation in this district is, of course, only possible with the aid of irrigation, the character of the soil and climate are such that where water is available most luxuriant crops of grain, fodder, roots, and fruit can be produced. It is evident from the inspection made and the information obtained that practically all the land suitable for cultivation in this district is now being occupied, the area, of course, being limited by the water-supply available. It is possible that this area might be materially extended by the construction of more extensive systems for water-delivery, and possibly further development may justify the construction of these more expensive irrigation systems, but until they are undertaken it would seem that there is little hope of more extended settlement or cultivation in the district.

The Lillooet District, owing to its elevation, climate, and soil, with irrigation is suitable for the production of practically all crops, including high-priced fruits, and many of the so-called larger ranches are very attractive in appearance. I ascertained, however, that a very considerable portion of the land under cultivation was being devoted to the continuous production of potatoes, and that, as was to be expected, continuous cropping with one character of crop has very materially reduced the output, and I am of opinion that unless steps are taken to introduce on these areas a proper crop-rotation system, particularly in the early introduction of the growth of alfalfa, clover, or some other leguminous crop, many of the most productive areas will be destroyed. I also understand that the condition referred to is largely due to the renting of large ranches to Chinese tenants, who persist in producing continuous crops of potatoes, and I fear that a continuance of this system will materially reduce the value of the land and crop productiveness of the district.

In view of the suitability of the district for a more intensive class of agriculture, it seems certain that the district would benefit materially in having the larger ranches cut up into smaller holdings, which could be devoted to the production of a higher-class product, including fruit and early vegetables, and the introduction of such a system would, without doubt, be of great material benefit to the general prosperity of the district.

Timber Resources.

On that portion of Section 1 of the line between Squamish and Pemberton the line passes through a continuous area of fine merchantable timber. Much of this timber is tributary to tide-water at Howe Sound and will, without doubt, be moved over the railway-line to mills at tide-water. There is also in this district a large quantity of timber suitable for pulp which should also move to present pulp and paper factories on Howe Sound.

Between the Lillooet River and the summit of the Cascade Range at Birken Station there is also a considerable body of merchantable timber which is tributary to the Lillooet River and Harrison Lake, and, within the latter district, also a considerable area of timber suitable for pulp which could be delivered by the railway-line for water carriage at the Lillooet River. The timber in both of the areas described is more or less difficult to log owing to the steep mountain-slopes, and it would seem that a very considerable proportion of it could be better manufactured through the medium of small mills on the railway-line than to haul over the railway-line as logs to tide-water or to the Lillooet River. There are already a few small mills operating locally on this section of the line and their number could be increased with advantage both to the timber-owner and the railway company.

Mineral Resources.

A careful study of all the reports and information available relative to the mineral deposits indicate that there is no immediate probability of the development of any extensive mineral resources tributary to Section 1 of the line. In the vicinity of Alta Lake, near the summit of the Coast Range, it is claimed that some copper properties have been located, but so far no extensive development is being carried on or ore taken out. In this vicinity there are also certain deposits of iron ore which were worked to a limited extent and some ore shipped out, but the workings are not at present being operated. It is understood that in the Lillooet Valley in the vicinity of Pemberton Meadows certain mineral claims have been located, but no further development carried on. On the west slope of the Cascade Range in the Birkenhead River Valley and tributaries it is understood that there are some promising copper properties adjacent to the railway-line, but no development-work has yet been undertaken. On Anderson Lake a large deposit of talc has been located, from which certain shipments have been made, but this mine is inoperative at the present time. At McGillivray Creek, emptying in Anderson Lake, some gold-mining has been carried on and a stamp-mill erected, but this mill is inoperative at the present time. From this point a trail runs over the summit to Cadwallader Creek, where some gold-mines are in operation.

There are other mineral prospects, as indicated by reports and information available, adjacent to different points on this section, but, as stated, there seems to be no prospect of immediate development which would create traffic.

Water-powers.

The streams flowing both ways from the summit of the Coast Range adjacent to the railway-line afford opportunities for small hydro-electric development, and there is the possibility of a considerable development on the Cheakamus River at Bear Mountain Canyon, where it is claimed that 40,000 horse-power is available. On the east slope of the Cascade Mountains a large power-development is receiving consideration by diverting the water of Ridge River, and certain preliminary surveys and development in connection therewith have been undertaken.

Tourist Resorts.

On Section 1 of the railway-line opportunities are offered for the erection of very attractive tourist resorts at several points. At Daisy Lake, Mons Station, at the summit of the Coast Range, there is already a small tourist chalet, and the possibility of developing a very attractive resort at this point, which, owing to its proximity to the Coast cities, affords an opportunity for material development. At Anderson and Seton Lakes, on the east side of the Cascade Range, there are also opportunities for tourist resorts, both of these lakes being of an extremely attractive character, but, unfortunately, possessing very precipitous banks on each side, and thus limiting the area for summer houses, except at the south end of Anderson Lake, on the flat between Anderson and Seton Lakes, and at the east end of the latter lake, where there is already a tourist chalet largely patronized by tourists on account of the attractiveness of the lakes and the character of the fishing.

TRAFFIC POSSIBILITIES.

The information given above relative to the resources tributary to Section 1 of the line does not justify any immediate expectation of an increase in traffic. It seems clear that the present haulage of logs from the timber areas to tide-water and, possibly, later, to small local sawmills will increase, and we are justified in anticipating that there will be haulage of pulp-wood over this section of the line at some future date to the pulp and paper mills at Howe Sound. In considering traffic of this character it must, however, be remembered that it is not of a permanent character, and that in time the timber resources will be entirely exhausted and that the district from which the timber is removed is not, as a whole, capable of being converted into other traffic-producing areas.

The additional development, as indicated above, of the agricultural areas tributary to this section in the Pemberton Valley and at Lillooet will, without doubt, stimulate the shipment of additional agricultural products and improve the one-way movement of merchandise, but the areas at both points are too limited in extent to justify the expectation of intensive traffic resulting therefrom.

The mineral resources tributary to this section might in time produce traffic, but this development is problematic, and it may be expected that it will be some years before these resources, even under the most favourable conditions, can be looked to to develop any considerable amount of railway traffic.

As has been pointed out, there exists the possibility of developing some very attractive tourist resorts at points on the lakes on this section of the line, and their development would be followed up by an increased local traffic. This traffic, however, can only be depended upon during a short summer season.

A careful consideration of all the natural resources tributary to Section 1 of the line justifies the statement that there is no immediate prospect of their development upon a basis which will create traffic sufficient to take care of the heavy fixed charges and operating expenses on this section of the railway.

SECTION 2.—LILLOOET TO WILLIAMS LAKE.

AGRICULTURAL LAND.

The agricultural areas in the Lillooet District at the southern end of this section have already been dealt with and are properly tributary to Section 1.

Crossing the Fraser River at Lillooet and proceeding north along the Fraser River, there are some small irrigated areas tributary to the line that have been developed as far as justified by the available water-supply for irrigation. On these areas, where water is available, good fodder and root crops are being raised, but the remarks given above relative to continuous cropping on land in the Lillooet District with potatoes are applicable also to many of the areas between Lillooet and Pavilion.

At Pavilion and in the valley of the Pavilion Creek there are some small areas of high productiveness, and in this district there are some large ranches, particularly the Carson Ranch, where large areas are devoted to the production of fodder in connection with stock-raising activities. Pavilion Valley, however, is limited in extent, and the summit is soon reached to the eastward, the agricultural areas east of that point being, of course, tributary to the Cariboo Road and the markets at Clinton and Ashcroft.

From Pavilion to Kelly Creek, where the railway-line leaves the valley of the Fraser, there is no possibility of any additional agricultural development adjacent to the line, which here follows the steep side-slopes of the Fraser Valley.

In certain of the bottom lands and also to the westward of the river some agricultural development is being carried on, but the latter areas are separated from the railway-line by the deep valley of the Fraser.

Leaving the Fraser River at the mouth of Kelly Creek, the line follows up the latter stream to the summit and thence north-easterly to Clinton. Along this route there are some small areas of agricultural land, but no possibility of any largely increased development.

At Clinton the line meets the Cariboo Road coming in from the south at Ashcroft. Along this road for some distance south and in the valley east and west from Clinton there is some agricultural development where water for irrigation is available, but the bench and

higher lands are suitable only for a limited amount of grazing and no opportunities offer for extended settlement.

From Clinton to Exeter the line crosses a high plateau of poor soil, with scattered bull-pine and brush, with many alkali ponds and lakes, suited only for a limited amount of summer grazing. To the east of the line, in the vicinity of Green Lake, there is some scattered settlement, but the district does not lend itself to any marked extension of settlement or development.

From Exeter Station an automobile trip was made east to Canim Lake, following the valley of Bridge Creek. In this valley there are some forty-seven settlers and to the east some fourteen along the shores of Canim Lake. This valley was one of the most attractive visited. Irrigation is not necessary and fine crops are raised. Information obtained indicated that land can be cleared and made ready for cultivation at a cost of about $40 per acre, and there is the opportunity of locating 150 additional settlers in the district, provided they are given encouragement and assistance, their present greatest need being a good road through the valley and its extension to the east along the south shore of Canim Lake, and the establishment of a creamery at Exeter Station.

From Exeter to Williams Lake the line closely parallels the Cariboo Road through a district particularly adapted for ranching. Several large ranches are met with, particularly those in the vicinity of 100-Mile House and Lac la Hache, and the high quality of the cattle seen was noticeable in this as well as in all the other ranching districts visited. This section is not suitable for agriculture without irrigation and further development is limited by the water-supply. Cattle must be fed during the winter season, which, of course, imposes a limitation upon ranching development. A very fine ranch with extensive irrigated areas is located at the St. Joseph Mission near Williams Lake, but, in my opinion, further agricultural development in this district is dependent upon subdivision of the large ranch areas and their utilization upon a more intensive system of production.

There is a large area of country tributary to this section of the line lying to the east and north-east of Williams Lake, in the Horsefly District. In this district, near Rose Lake, Harper's Camp, and at other points along the road from Williams Lake to Horsefly Lake, there is considerable settlement, and the possibility of extending this settlement if a first-class road is provided and some assistance given in clearing land and bringing it under cultivation.

Also tributary to this section of the line is the extensive ranching area in the Chilcotin District lying to the west of the Fraser River. An extensive automobile trip of some 100 miles was made through this district, whose marketing centres are on the railway-line at Williams Lake, Chasm Station, and Clinton.

The Chilcotin District is a high plateau with large areas of open prairie country and scattered timbered areas of jack-pine and poplar. The growth of bunch-grass is sparse, indicating the semi-aridity of the district, but it is specially adapted for summer grazing of cattle, sheep, and horses, which have to be fed during the winter months. In the valleys or at points where water is obtainable for irrigation bountiful crops of fodder are raised, but these areas are somewhat limited in extent and the fodder for winter feeding which can be raised is, of course, a limiting factor upon the total of stock production. The district contains several large ranches, and again the high quality of the cattle seen grazing at large was noted. The annual shipment of beef cattle from this district amounts to some 3,000 head, and it seems probable that the district is now carrying about as many cattle as can be taken care of, and that unless extensive additional areas can be brought under irrigation for production of fodder-crops the number of export cattle is not likely to be largely increased in the near future. The Chilcotin District is suitable only for ranching, outside of the small areas which can be irrigated, but development in the district can be materially aided by improving the main roads to the marketing centres on the railway-line.

Timber Resources.

There are not large areas of merchantable timber immediately tributary to this section of the line. The timber adjacent to the line is largely bull-pine, jack-pine, and some poplar, and, as a fact, many districts would be improved for ranching and settlement purposes if this timber was burned off.

North-east from Williams Lake, in the Horsefly Lake District, there are some large areas of fine timber and also of pulp-wood, but this timber is tributary to Section 3, via Quesnel Lake and River, and is more particularly dealt with later on.

MINERAL RESOURCES.

There are no indications of mineral resources of special value immediately tributary to this section of the line.

In the vicinity of Clinton deposits of carbonate of soda, sulphate of soda (Glauber salts), and magnesium sulphate have been located and some shipments made, but these deposits are not likely to be largely developed or result in heavy shipments for some time. The only other mineral deposits heard of were some claims to the east of Lac la Hache which are undeveloped.

The new placer-gold discoveries in the Horsefly and Quesnel Lake Districts are tributary to the line, with Williams Lake as shipping-point, and if these diggings prove of value, both freight and passenger traffic to that point will be stimulated. Placer-gold mining, however, is not of a character to induce permanent development and cannot be counted upon to produce an increasing and permanent character of traffic.

Reports were received of the location of a seam of good coal near the east end of Canim Lake, but this is too remote to be of value except for local consumption by settlers in the vicinity.

WATER-POWERS.

Some small hydro-electric development projects are noted as being possible in this district on the Bonaparte, Mahood, Clearwater, Horsefly, and Chilcotin Rivers, but none of these are of sufficient size to attract special notice or capable of supplying anything but local needs when increased settlement and development in the district creates a demand.

TOURIST RESORTS.

Lac la Hache, the south shore of which is followed for some 10 miles by this section of the line, is a very beautiful lake of good water and offers exceptional facilities for summer houses and a delightful tourist resort. Lake Canim, on account of the good fishing obtainable and the beauty of the surroundings, also offers attractions for the tourist. The remoteness, however, of these lakes prevents the probability of their attractiveness being utilized to any marked extent in the near future.

TRAFFIC POSSIBILITIES.

There is nothing to indicate that any marked increase in traffic on this section of the line can be looked for in the near future. The further colonization and development of land in the Bridge Creek Valley, Canim Lake, and Horsefly Districts will provide additional traffic of a permanent character, but the progress of this development will be entirely dependent upon the construction of good roads and the colonization assistance given the settlers.

The total inward and outbound traffic of the large Chilcotin District is tributary to this section of the line, but, as has been pointed out above, the district is one suitable for and devoted entirely to ranching, and there is nothing to justify the expectation of increased development within the district or traffic therefrom in the near future. These remarks also apply to those districts tributary to the line in the Lac la Hache and Williams Lake Districts, which are devoted to ranching.

SECTION 3.—WILLIAMS LAKE TO QUESNEL.

AGRICULTURAL DEVELOPMENT.

Leaving Williams Lake the line follows the valley of Williams Lake Creek westerly to the valley of the Fraser, and thence north along the Fraser until Quesnel is reached at the mouth of the Quesnel River, and for the greater portion of this distance the railway-line closely parallels the Cariboo Road.

Practically all the river-bottoms of the Fraser Valley on this section are occupied and many fine farms are noted, particularly the Moffat Ranch, the Australian Ranch, and that of Yorston Bros. These bottom lands are irrigated from small streams, tributaries of the Fraser, and very luxuriant grain and fodder crops are produced. There are also some considerable areas of cleared and cultivated areas on the first benches above the river, and also farther back from the river on the higher benches. Inspection of the district indicates that there are large areas tributary to the line on this section that offer splendid opportunity for additional settlers, the soil being good, the timber fairly light, and, as one approaches Quesnel, the need for irrigation less marked.

It is safe to assume that adjacent to the line between Soda Creek and Quesnel the present number of settlers could at least be doubled, as the district produces good crops, is specially adapted for dairy-farming, and the clearing of timber is not too burdensome. A special effort should be made to colonize these additional areas and make them productive.

There is also a large area of bottom and bench land of a similar character tributary to this section of the line on the west side of the Fraser River, across to the railway-line being provided by ferries across the river at Castle Rock and Quesnel. The section of the line from Soda Creek to Quesnel (including the land on the west side of the Fraser River), and also a large area tributary to the town of Quesnel, certainly offer greater prospects of agricultural development and resulting traffic than any other portions on Sections 1 and 2.

A creamery has now been established at Quesnel, and if some more frequent facilities are afforded for moving cream on the railway-line, and some encouragement and assistance given to new settlers in the district in clearing the land and establishing homes, I would look forward to its becoming a well-settled and successful agricultural area, with several hundred additional settlers. To aid in this I suggest a small cold-storage plant, jam-factory, and an egg section as adjuncts to the creamery at Quesnel, which would materially assist in the development of the district.

It is also desirable that the east and west roads on the west side of the Fraser, giving access to the railway-line via the ferries at Castle Rock and Quesnel, and also those reaching stations on the railway-line from adjacent territory on the east side of the river, should be put in first-class condition and maintained as main marketing highways in the district.

Timber Resources.

There is no large area of merchantable timber immediately tributary to this section of the line. There is sufficient timber for local use and its quality improves as you proceed north, but none which would justify extensive lumbering operations or manufacturing on the line, except for local demands.

Reports have been examined regarding very large areas of fine timber and a large supply of pulp-wood situated on Quesnel and Horsefly Lakes and tributary waters. This timber is all tributary to the railway-line at Quesnel via the Quesnel River, and will no doubt be ultimately brought to that point for manufacture. It is stated that comparatively small expenditures will render the Quesnel a safe driving stream for logs, and the railway transportation offered at Quesnel, together with the fact that a good mill-site is available there, and that nearer railway facilities are not at all probable, justify the expectation that these valuable timbered areas will sooner or later be developed and afford traffic for the line at Quesnel.

Mineral Resources.

The world-famous Cariboo placer-gold mining district is tributary to this section, and the new discoveries made in the southern portion of that district tributary to Quesnel and Horsefly Lakes may result in a renewal of the activity which first attracted attention to the district. The small amount of prospecting for other minerals carried on in the district prior to railway connection being provided has resulted in production of samples of free gold, silver, copper, lead, and other mineral deposits, and there is every reason to expect that continuous prospecting will locate valuable mines in this highly mineralized district. Placer-mining will, of course, be carried on for many years, and attention is now being directed to large areas tributary to the Quesnel and Cottonwood Rivers which promise satisfactory return in gold and platinum though dredging operations.

In the immediate vicinity of Quesnel extensive deposits of diatomaceous earth have been located, which may prove of commercial value later on.

South of Quesnel some small outcroppings of lignite coal occur, and on Australia Creek a seam of this coal is being worked which provides a fairly good domestic fuel, but is valueless for industrial purposes on account of its high ash content and low fixed carbon.

Speaking generally of the mineral resources tributary to this section, it may be said that the information available justifies the expectation that more detailed geological examination and careful prospecting will locate valuable mineral deposits and result in extensive development.

WATER-POWERS.

This district, in common with all those adjoining the line, offers many opportunities for the development of small hydro-electric development, and on the Quesnel River at two points somewhat extensive power plants could be developed. However, there will be no justification for the development of power or electric energy at any of these points until settlement becomes much more widely extended in the district and active development of the timber and mineral resources undertaken.

TOURIST RESORTS.

There are no points immediately adjacent to this section of the line which offer opportunity for the development of tourist resorts.

The town of Quesnel is a very attractive site for summer homes and may in time attract people who wish to spend the holiday season in an attractive district of Northern British Columbia, and the large lakes to the east (Quesnel and Horsefly) will continue to attract sportsmen owing to the excellent fishing and big-game shooting, but these districts are too remote from the railway-line to attract ordinary tourists.

TRAFFIC POSSIBILITIES.

That portion in this section of the line in the Fraser Valley from Soda Creek north to Quesnel affords an opportunity for largely increased traffic resulting from extended agricultural development. The district in question is, as has been explained above, capable of supporting a large number of additional settlers, and if actively developed should provide a more intensive local traffic than any other portion of the line to the south.

Ultimately, traffic will no doubt result from the manufacture of lumber and, possibly, pulp at Quesnel, resulting from the development of the large timbered areas at Quesnel and Horsefly Lakes and tributary streams, but expenditures must be made in improving the Quesnel River for driving purposes before traffic will result therefrom.

The information available also indicates the probability of future development of mining areas in the district tributary to this section of the line, resulting, of course, in traffic consequent upon the movement of machinery and supplies, but for the immediate future I cannot see any prospect of increased traffic resulting from development of resources tributary to the line, except that resulting from further development of the agricultural areas in the Fraser Valley as outlined above.

SECTION 4.—QUESNEL TO PRINCE GEORGE.

The uncompleted portion of the line from Quesnel to Prince George was not personally examined. I had previously inspected the district for some 20 miles south and west from Prince George, and the only means of transportation from Quesnel to Prince George was by small motor-boat on the Fraser, which would afford no opportunity of inspecting the country adjacent to the located railway-line.

I have carefully perused all available reports on this district, and especially that submitted by R. J. Work, Right-of-way Agent of the company, under date October 3rd, 1921.

The information disclosed by these reports indicates that this unfinished portion of the line intersects districts suitable for further agricultural development, this being especially the case in the vicinity of Stone Creek, Strathnaver, Meadow Creek, and 10-Mile Lake.

The soil in these districts appears to be good, irrigation not necessary, and the timber easy to remove, but these reports also make it clear that there are no other special resources of timber or minerals tributary to this section; and while it may be assumed that the completion of the line would stimulate the agricultural development, it seems very doubtful whether sufficient traffic to meet operating expenses would result, particularly as that portion of the district for 20 miles south and south-west of Prince George is naturally tributary to the Grand Trunk Pacific line at that point.

It is also to be noted that several of the districts tributary to this section, which are suitable for agricultural development, as explained above, are comprised of large holdings in private hands, and it seems quite clear that in this instance, as well as at other points on the railway-line previously referred to, some steps must be taken to subdivide these large holdings and introduce an active colonization policy before the somewhat limited agricultural areas tributary to the line can be brought to a full measure of productiveness.

GENERAL REMARKS.

In completing the general inspection of the natural resources tributary to the Pacific Great Eastern Railway and reporting thereon as outlined above, I have, of course, devoted no consideration to the location and construction of the railway-line from an engineering standpoint, as that did not come within the scope of the duty delegated to me. I venture, however, as an engineer, to express my surprise regarding the character of the location of portions of the line, particularly that north from Lillooet along the steep slopes of the eastern bank of the Fraser Valley.

I was agreeably surprised with the character of construction and physical condition of the railway-line, but realize the high cost of construction and of future maintenance, and refer to these facts only because the fixed charges resulting from construction and operating cost can only be met by intensive traffic resulting from development of natural resources tributary to the line. It would seem clear that the Pacific Great Eastern Railway must be looked upon purely as a colonization line and cannot in any sense be expected to fulfil any function of through traffic, and, as a consequence, considering the fact that the line is now owned by the Province, I venture to point out that it will be necessary to undertake certain activities and large expenditures by the Government in aiding the early development of the natural resources tributary to the line, which they would not be called upon to undertake if the road was the property of a private corporation, and with this in mind I respectfully submit the following:—

RECOMMENDATIONS.

(1.) Steps should be immediately taken to create a Colonization and Development Department of the railway's service. This Department should be headed by an official with the title of "Development Agent," whose duties would include all right-of-way, townsite, and industrial matters, and whose first activity should be the preparation of a carefully prepared report, graphically illustrated by a map, showing the location and character of all agricultural, timber, mineral, water-power, and other resources tributary to the line.

Having prepared this report and map, he should submit recommendations relative to the assistance to be granted by the Government in developing such resources, and such recommendations should include:—

(*a.*) The selection of certain agricultural areas tributary to the line within which increased agricultural development must be expedited by Government assistance in clearing of land, establishment of creameries, jam-factories, cold-storage and egg-collecting plants.

(*b.*) The location of the main marketing roads to the east and west from the railway-line and their immediate improvement to afford more ready access in the delivery of agricultural products to shipping-points.

(*c.*) The preparation of the necessary literature and maps for general distribution to indicate areas which offer opportunity for further agricultural development, and the establishment by the railway company of colonist passenger and freight rates to induce settlement of these areas.

(*d.*) The consideration of, and the recommendation of, a policy under which large holdings in private hands tributary to the line can be subdivided and colonized so as to permit of more intensive settlement and cultivation.

(*e.*) The preparation in condensed form, for issue as a pamphlet, of the most reliable information obtainable relative to mineral resources tributary to the line, and, possibly, before this is done, a more thorough investigation by the Mineralogist of the Government service, so that when this pamphlet is issued for the guidance of prospectors the information contained therein may be of the most complete and reliable character.

(*f.*) A further study and inspection of the timber resources tributary to the line, together with information as to methods of getting this timber to the line, including improvement of streams for driving purposes and the encouragement, as far as possible, of the location of small lumber-mills at different points on the line to handle the smaller areas of timber immediately adjacent to the line.

(*g.*) A careful study of the industrial and business opportunities at points on the line and the completing of reliable data relative thereto, including water or other power development, so that any and all inquiries regarding industrial and business openings can be promptly replied to.

(2.) From Clinton to Quesnel the Pacific Great Eastern Railway practically parallels the Cariboo Road. This road, which is a main trunk highway, and which is being kept in first-class condition is, and always will be, a serious competitor with the railway-line in the movement of local traffic.

It would seem evident that the Province cannot undertake to maintain both this trunk highway and the parallel railway-line, particularly in view of the fact that the portion of the district served by the railway-line north of Clinton has the present more urgent need of a better system of marketing highways from east and west of the railway-line. It is respectfully suggested that if small sections of the Cariboo Road necessary for use by existing settlers to reach their marketing centres were maintained as public highways, the other large sections of this road now operated in competition with the railway-line might properly be put upon a toll basis and the receipts resulting therefrom devoted to the improvement of the east and west marketing roads so urgently needed to aid in further development of agricultural, ranching, timber, and mineral areas.

CONCLUSION.

From a careful and detailed inspection of the natural resources tributary to the Pacific Great Eastern Railway, and a careful study of all the available reports relative thereto, I am forced to the conclusion that, while there is the possibility of materially extending the present development of the agricultural, timber, and mineral resources, through the medium of Government assistance, as outlined above, there is no prospect that traffic can be created as a result of such development, at least for many years to come, sufficient to provide for the heavy fixed charges resulting from the construction, maintenance, and operation of this railway-line.

I am, Sir,

Your obedient servant,

J. S. DENNIS.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1922.

REPORT

ON THE

PACIFIC GREAT EASTERN RAILWAY

ITS ORGANIZATION AND OPERATION, WITH RECOMMENDATIONS

BY

W. P. HINTON

THE GOVERNMENT OF
THE PROVINCE OF BRITISH COLUMBIA

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1922.

Report on Pacific Great Eastern Railway.

By W. P. Hinton.

Victoria, B.C., April 8th, 1922.

The Hon. John Oliver,
Presiding Director, Pacific Great Eastern Railway,
Victoria, B.C.

Dear Sir,—In accordance with your letter of the 21st ulto., I desire to respectfully submit a memorandum report containing my observations, analyses, comments, and recommendations pertaining to the organization, operation, and maintenance of the Pacific Great Eastern Railway.

I did not examine the entire property at this time, having been over the greater part of it previously quite critically, besides being generally familiar with the balance of the country served since, and can estimate generally the operating conditions and possibilities.

All available data were closely studied, as well as an inspection of the North Shore line and at Squamish, resulting in the report and conclusions reached in brief form in the enclosed, and in order that you may have a summary of the matter contained therein, the following may be of use:—

(1.) The officers and staff generally are capable and discharge their duties efficiently; material reductions are not practicable or are inadvisable pending development of and decision on your future policy.

(2.) Increased rates generally to provide additional revenue are not practicable. They are already so high as to bear very heavily, if not prohibitive in some cases.

(3.) Accounting, purchasing, stores, etc., departments are systematically conducted and in accordance with the best methods.

(4.) North Shore Division should be put in the tramway class to reduce operating expenses and efforts made to dispose of or abandon the line.

(5.) Squamish Division: The future operation of this line or part of it between Squamish and Clinton to be carefully considered. The low tonnage capacity of trains, the absence of traffic possibilities of an attractive nature, the difficulty of maintaining the line and in many places constantly subject to destruction, also the excessive wear on track, ties, structures, motive power, and rolling-stock, should be justified only for a heavy traffic. It is on this division that your heavy operating costs occur. The report shows that this excessive cost over normal is approximately for 1921:—

Maintenance way and structures	$175,000 00
Transportation	50,000 00
Total	$225,000 00

Exclusive of excessive wear on rails, motive power, and rolling-stock, as well as costly interruptions and delays to traffic.

The maintenance charges will now increase very rapidly, as the 16,000,000 feet of timber in bridge and trestle construction must all be renewed within the next few years or replaced by steel or concrete. The cost of these renewals may be figured in place at probably $2,500,000, so that this sum must be figured in addition largely to present losses, as it cannot properly be charged to capital account, the latter carrying only the difference between cost of renewal in kind and the cost of permanent structures.

(6.) The construction of the line to Prince George should be proceeded with, as the material is largely paid for and delivered; economies in operation can be effected thereby and an outlet furnished by direct rail connection to reach markets, stimulating settlement wherever possible and making operations already started in the territory of the Pacific Great Eastern surer of success.

The officers and staff rendered every assistance; in fact, welcomed this opportunity of having an independent examination of their work, together with any helpful suggestions which I was able to make to them in our several discussions and inspections.

I have not reported on the physical condition of the property, except in so far as it affects the earning power and costs of maintenance and operation in its relation to the losses which have been sustained. In that respect the prospects for improvement are most discouraging.

All of which is respectfully submitted.

I have the honour to be,

Respectfully yours,

W. P. HINTON.

Its Organization and Operation, with Recommendations.

OPERATING ORGANIZATION.

The general officers and staff at Vancouver comprise, both in numbers and remuneration, about the minimum requirements for the bare operation and supervision of the respective departments under existing conditions, but outside of clerical assistance might easily handle a larger operation and much greater business. The office system records and other details are handled efficiently.

There is a distinct disadvantage in not being in direct personal contact with the railway operating forces, which can be obtained by the removal of some of these offices to Squamish, in which case office accommodation and housing would have to be provided. It is doubtful if sufficient saving could be effected; in fact, my belief is that the capital expense involved would easily exceed any direct saving. Further, bearing in mind that communications between Squamish and Vancouver are uncertain and involve much delay at times, it would seem advisable not to make any change in the location of the general offices from Vancouver.

A larger question arises as well in any change of this kind, for if the railway is to be connected up between Whytecliff and Squamish, it is obvious that Vancouver is the logical point for the general offices. Further, if the line is constructed between Clinton and Ashcroft, another situation would arise which would make it unwise to establish offices at Squamish.

ORGANIZATION.

The general supervision of the operation of the property is necessary, but as this does not involve decisions on matters of general policy, the General Manager discharges the functions of a General Superintendent on other transportation systems and would more aptly describe the jurisdiction. There is nothing to be gained by making the change in title, however, and the services rendered under all the circumstances are considered satisfactory.

Mr. Buckworth has obtained a good grasp of the situation and in many directions has produced economies and eliminated waste. He is well supported by his staff.

The assignment of duties to the different members of the general staff is done to the best advantage. The salaries paid to the members of the staff are in no cases higher than their duties call for; in fact, they must be considered, generally speaking, as quite the reverse in relation to those paid for similar duties elsewhere.

TRAFFIC DEPARTMENT.

This department is capably and economically handled. Tariffs have been examined and the different features of the traffic discussed with the General Freight Agent, including applications pending for reduction or adjustments of charges, and the methods employed in all cases appear to be sound and fair. It would not seem practicable to increase rates at present: in fact, they may bear too heavily in certain directions to make or develop traffic, but to reduce them would result in definite losses to sustain in the actual cost of handling the business.

ACCOUNTING AND FINANCE.

The system and practice of these important divisions of the work is particularly well handled, and while some of the work might be incorporated with and under direction of the Comptroller-General of the Province, it is doubtful if much, if any, saving in expense could be accomplished. In any event, it might make a difference of one accountant less, but this I have not been able to definitely determine in the absence of Mr. Mouat.

NORTH SHORE DIVISION.

The operating loss on this division was over $29,000 in 1921. The prospect is no better for 1922 owing to heavy maintenance necessary and personal-injury claims. There is no prospect for improved earnings in any way encouraging. The competition from the municipal ferries and bus service is ruinous and makes a passenger service on this division largely unnecessary and superfluous. Realizing that there may be sufficient reasons for continuing to operate regular service notwithstanding probably sufficient reasons for denouncing any contracts with the municipality, immediate steps should be taken to treat this as a tramway-line, which it is, and thus get away from the standard railway wages and schedules. In this way, as a first saving, the North Vancouver staff could be reduced to an agent and assistant instead of the present Trainmaster and two agent dispatchers. Both train crews employed would also be out of standard wages and schedules. The shops seem necessary to handle the constant motor repairs and have a minimum staff for the work. The Stores Department showed careful handling except in the fuel-oils supply, which is wasteful on account of proper tanks and measuring apparatus not being furnished. A moderate capital expenditure for tanks and measuring-pumps would make a sufficient saving to warrant the expenditure.

The two gasolene motor-cars are obsolete, of a discarded type wherever previously used, and are a constant source of heavy expense for upkeep and their performance is very poor.

The entire passenger revenue on the North Shore line in 1921 was $50,228.92 for 82,681 train-miles, or about 61 cents per train-mile. The expense was:—

For fuel	17	cents per train-mile.
For motor repairs	10	„ „
For passenger-car repairs	3½	„ „
Total	30½	„ „

Aside from overhead, wages, materials, and other supplies which might be estimated.

Other operating expenses, 33 cents per train-mile, a total cost of operation outside of any consideration for return on capital or for depreciation, which results in a direct loss.

It is quite hopeless, therefore, to expect the North Shore Division to meet expenses so long at least as the municipalities operate competing facilities.

It is not recommended that new motor-cars be obtained. If the gas-electric cars, which are of a good type, are used for all regular service, the two gas-motors being kept in reserve for emergencies, all necessary power would be available, provided an electric car-pull was provided at the ferry to take and place cars when the motor spotted them during free time between road scheduled runs. A car-pull of this type is in service at Swanson Bay and should render adequate service available at all times to prevent delays. Care must be taken to get a much stronger pull than seems necessary to ensure reliability under all conditions.

I am not dealing with the possibility of making arrangements with the British Columbia Electric Company for the operation of part of or the entire line in the event that it is decided improbable that the North Shore Division will be connected eventually with the Squamish Division. As already pointed out, this North Shore line is only a tramway and should be treated as such if practicable, as the reduction in expense would be very considerable.

SQUAMISH.

The main wharf is in an unusable condition and it would seem useless to rebuild, as it will inevitably be expensive to maintain and assuredly be destroyed in due course owing to its situation. The car-ferry slip fortunately escaped destruction, but its situation is too precarious to hope for escape ultimately. The removal to a new and the only proper site for these wharves and slips would involve a large capital outlay not justified by prospective future development of traffic.

The working staff at Squamish is small and only sufficient to carry on operations.

The car-shops are sufficient, but need some additional equipment to perform work economically. The cost of car repairs, both freight and passenger, is quite low and must be considered as covering only unavoidable repairs and upkeep.

The engine-house and machine-shop are very badly located, and in case of fire, as there is no tail-track, it would not be possible to save any locomotives which would be in at the time. Engine repairs require additional machinery with the increase of line and motive power. Housing

space is very much too small for such machinery as is in place at present, making a crowded condition, which is far from economical and dangerous to the workmen to operate. The cost of engine overhaul and heavy repairs is low in comparison with similar work elsewhere.

It will be unwise to add to the expense at Squamish for enlarged facilities and additional machinery if the line is to be completed into Prince George in the near future, as the heavy repairs can be done there to greater advantage and with much less expense in conjunction with the Grand Trunk Pacific work.

The General Foreman at Squamish, who has charge of the motive power and equipment of the line, appears to be well above the average in ability and careful regard for economy. His outline of the arrangements made at Williams Lake for light running repairs appears to be what is barely necessary and no avoidable waste or extravagance is apparent.

The stores are sufficient, handled in approved and methodical manner.

FLOATING EQUIPMENT.

The revenue was	$30,000 00
The cost of operation was	35,000 00
Loss	$ 5,000 00

Bearing in mind the large quantity of company's material handled without charge, the handling of empty or non-revenue cars and interchange of equipment between the North Shore and Squamish Divisions, no fair criticism can be applied to the deficit on this operation.

HYDRO AND WATERWORKS.

These utilities were not examined, reports as to reliability and adequacy being favourable.

SQUAMISH DIVISION OPERATION.

A fair train-tonnage rating under normal conditions would be:—

MAIN TONNAGE.

	Cons. Locos.	Mikados.
For Squamish to Clinton	450	500
For Clinton to Williams Lake	1,000	1,200

The average train tonnage hauled was:—

Squamish Subdivision	446 tons.
Lillooet Subdivision, north-bound	483 „
„ south-bound	407 „

This indicates that great care was taken to avoid unnecessary operation of trains and it must be considered very good performance. Further reference will be made to the low train-tonnage possibilities of the line between Squamish and Clinton.

LOSS AND DAMAGE TO FREIGHT.

This amounted in the year to four-tenths of 1 per cent. of the freight revenue. On other lines it is rarely, if ever, below 1½ per cent. and runs as high as 5 per cent. This reflects very favourably on the operating officials.

TRANSPORTATION COSTS.

An analysis of the tonnage handled and locomotive-miles run discloses the very high proportion of non-revenue traffic carried, 15 per cent. of the entire business and locomotive-miles for work-trains, 17½ per cent. of the total road-mileage. The result is that transportation costs are abnormally high in relation to revenue. The revenue freight-train miles aggregated 14,992 miles, the work-train mileage 13,862. Operating expenses of all trains were $8.669 per train-mile, and as work-trains are quite as expensive to operate as others, we have a charge for transportation for work-trains of, say, $60,000, nearly all on the Squamish to Clinton Division, which, if it could be maintained as other lines in British Columbia generally, would save probably $50,000. This will be dealt with later.

MAINTENANCE WAY AND STRUCTURES.

The cost of this department distributed over the average mileage operated was about $1,200 per mile. We must consider, however, that the line north of Clinton is new and required very little expense. The charges fell almost altogether on the North Shore line and the Squamish to Clinton section. This will show a cost of about $2,000 per mile, where, under conditions usually existing on a newly constructed line with light traffic, the charge should not be more than $600 per mile. As a result, the excessive expenditure, quite unavoidable, is about $175,000. This item will also be reviewed later, as well as the extra cost for maintaining equipment owing to the physical nature of the line. It will be shown that these charges will increase materially in the near future if the line is to be kept in safe operation.

TRAFFIC.

Of the total revenue tonnage handled (53,351 tons), 20,265 tons represented logs and other rough forest products, or about 38 per cent. of the entire revenue freight traffic. Under the most favourable circumstances—that is, if a full train-load of logs of fifteen cars in handled for the maximum distance for which tariff is provided, 50 miles—the revenue will be:—

One car 6,500 feet at $3.20 per M., $20.80.	
Fifteen cars at $20.80	$312 00
Cost of operation, all trains, $8.669 per train mile	433 45
Loss per train	$121 45

While much of the log traffic may be handled in regular trains, it will make no difference on this computation. The rates on logs are already high, and if increased by 50 per cent. in order to yield a net operating return to the railway they will be so burdensome as to make logging operations unprofitable. It constitutes such a large proportion of the revenue tonnage, and is within measurable distance of exhaustion in any case, with no substantial prospects of tonnage on the Squamish Division to take its place, that the prospects are discouraging, if not hopeless, in the future operation of the line, all of which has an important bearing on the future policy with regard to the continued operation of this division.

The movement of other manufactured products of the forest and mines must be severely handicapped through the necessity of high charges being made to Vancouver to place these products in competition with mills or mines more favourably situated for the local market or for direct shipment; in fact, similar conditions exist, hindering development in agriculture, settlement where possible, and establishment of the few industries which might thrive under more favourable circumstances. In other words, development and settlement cannot reach any measure of success. This will be dealt with further in the summary of the situation.

It is also noteworthy of the tonnage statistics that of the entire freight revenue traffic, 49,934 tons originated on the line and only 3,417 tons, or 6.4 per cent., on foreign lines.

The train service, twice a week, as shown in the train-tonnage figures, is barely sufficient to handle the traffic, so that no reduction is practicable.

In passenger traffic it is not recommended that tourist or other feature advertising be conducted, as the possibilities for much development are slight, and it is better to keep expenditures to a minimum in that direction, for the traffic during a relatively short season would be small, but would force expenditures in equipment and service which would be quite unjustified.

LOCOMOTIVE FUEL.

One of the principal and most important items of cost of operation is that of locomotive fuel. The cost of fuel-oil at Squamish is $2.15 per barrel. In relation to coal of a good bituminous quality, such as the best Island or Alberta coal, it is customary by the oil companies to estimate 3½ barrels of crude oil the equivalent of 1 ton of good coal. In performance it is well established that not less than 5 barrels, or slightly more, is the true equivalent, and this includes the cost of labour in handling coal, ashes, wastage, and overhead. In other words, the cost of fuel-oil, $2.15 per barrel, is at the rate of $10.75 for coal or more at Squamish. With the completion of the line into Prince George, furthermore, the cost of high-grade bituminous coal should not exceed $7 to $7.50 per ton, and the haulage will be much more favourable than from Squamish north. This fuel then can be procured cheaper at home instead of sending the money

abroad. Under these circumstances, no further oil-burning locomotives should be purchased, and arrangements should be made to convert present oil-burners to coal.

PHYSICAL CHARACTER OF LINE IN RELATION TO OPERATING COSTS.

The comments preceding this portion of my report indicate that:—

(1.) The operating costs of the North Shore line and the Squamish Division to Clinton are so great as to preclude any possibility of net operating revenue.

(2.) Costs of maintenance and expenditure on capital account must increase. Bridge renewals and repairs outside of capital account will now increase, if the factor of mere safety is to be met, at the rate of at least $250,000 per year, without hope of reducing other maintenance costs.

(3.) It is hopeless to expect any great increase—in fact, the tendency is for a decrease—in revenue over the line between Squamish and Clinton.

Consequently, consideration must be given to the advisability of abandoning the entire line from Squamish to Clinton when the Prince George connection is obtained or to maintain the line between Squamish and D'Arcy from that time. To possibly use salvage from the line taken up as part of the cost of constructing a line from Clinton to Ashcroft in order to give adequate and in every way suitable through connection between the southern and northern sections of the Province.

In this way the line would be preserved where there are traffic possibilities and operating costs would be normal. It would connect the line most effectively with the outside to afford markets on a favourable basis with other competitors, so that colonization and the development of industries would be possible, and, furthermore, be the means possibly of making the property more attractive to other railway-lines to lease and operate under suitable conditions, thereby relieving the people of the Province to a very marked extent of an obligation which is bearing and must increasingly become intolerably burdensome. There can be no hope of effecting arrangements to relieve the Province under present conditions and prospects, but if the connections are effected at Prince George and Ashcroft, the Province only retaining the line, if any, north of Squamish until it too can be entirely abandoned, then it should not be difficult to conclude arrangements that would meet with the general approval of the public as constituting a welcome relief from the present burden.

Respectfully submitted.

W. P. HINTON.

VICTORIA, B.C.
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1922.

PROVINCE OF BRITISH COLUMBIA

SIXTEENTH ANNUAL REPORT

OF THE

DEPARTMENT OF AGRICULTURE

FOR THE YEAR 1921

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1922.

To His Honour WALTER CAMERON NICHOL,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

I have the honour to submit for your consideration herewith the Annual Report of the Department of Agriculture for the year 1921.

E. D. BARROW,

Minister of Agriculture.

Department of Agriculture,

Victoria, B.C., March 31st, 1922.

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BRITISH COLUMBIA DEPARTMENT OF AGRICULTURE.

BRANCHES AND CHIEF STAFF MEMBERS, YEAR 1921.

Minister of Agriculture:

Hon. E. D. Barrow, M.P.P.

Deputy Minister:

Dr. D. Warnock, F.R.C.V.S., O.B.E.

Departmental Secretary:

Wm. J. Bonavia.

Statistician:

G. H. Stewart.

Horticultural Branch:

W. H. Robertson, B.S.A., Provincial Horticulturist and Inspector of Fruit Pests (Victoria).
W. T. Hunter, B.S.A., District Horticulturist and Inspector of Fruit Pests (Vernon).
E. W. White, B.S.A., Assistant Horticulturist and Inspector of Fruit Pests (Victoria).
E. C. Hunt, B.Sc., Assistant Horticulturist and Inspector of Fruit Pests (Nelson).
H. H. Evans, District Field Inspector (Vernon).
C. R. Barlow, District Field Inspector (Salmon Arm).
T. M. Anderson, District Field Inspector (Kelowna).
J. Tait, District Field Inspector (Summerland).
R. P. Murray, District Field Inspector (Penticton).
R. A. Newman, District Field Inspector (Vernon).
Paul C. Black, District Agriculturist and Field Inspector (Grand Forks).
C. B. Twigg, B.S.A., District Agriculturist and Field Inspector (Creston).
G. L. Foulkes, Secretary.

Imported Fruit and Nursery Stock Inspection Branch:

W. H. Lyne, Chief Inspector of Imported Fruit and Nursery Stock, Rice, etc. (Vancouver).
D. Gavet, Assistant Inspector of Imported Fruit and Nursery Stock, Rice, etc. (Vancouver).
W. J. Graham, Assistant Inspector of Imported Fruit and Nursery Stock, Rice, etc. (Vancr.).
H. F. Olds, Assistant Inspector of Imported Fruit, Vegetables, Rice, etc. (Vancouver).
M. L. Bird, Assistant Inspector of Imported Fruit, Vegetables, Rice, etc. (Vancouver).

Plant Pathology and Entomology Branch:

J. W. Eastham, B.Sc., Plant Pathologist (Vancouver).
M. H. Ruhmann, Assistant Entomologist (Vernon).
E. R. Buckell, Field Assistant (Vernon).

Markets Branch:

J. A. Grant, Prairie Fruit Markets Commissioner (Calgary).
H. Gutteridge, Assistant Potato Inspector (Vancouver).
A. Irving, Assistant Potato Inspector (Vancouver).

Live Stock Branch:

W. T. McDonald, M.S.A., Live Stock Commissioner (Victoria).
J. R. Terry, Chief Instructor in Poultry-raising (Victoria).
Chas. Good, District Poultry Instructor (New Westminster).

Live Stock Branch—Continued.

CHAS. W. TRAVES, District Poultry Instructor (Grand Forks).
W. NEWTON, B.S.A., M.S., Chief Soil and Crop Instructor (Victoria).
C. TICE, B.S.A., Soil and Crop Instructor (Victoria).
G. C. HAY, B.S.A., District Agriculturist (Kamloops).
ANGUS L. HAY, District Agriculturist (Cranbrook).
Dr. A. KNIGHT, V.S., Chief Veterinary Inspector (Victoria).
Dr. S. A. K. WHITE, B.S., Assistant Veterinary Inspector.
Dr. W. W. ALTON, V.S., Assistant Veterinary Inspector.
Dr. B. R. ILSLEY, V.S., Assistant Veterinary Inspector.
Dr. W. T. BROOKES, Assistant Veterinary Inspector.
Dr. M. SPARROW, Assistant Veterinary Inspector.
Dr. J. D. MCDONALD, Assistant Veterinary Inspector.
*R. J. FERRIS, Silo Demonstrator.
W. H. STROYAN, Poultry Caretaker.
GEO. PILMER, Brand Recorder.
R. CAHILTY, Brand Inspector.
*C. PHELPS, Foreman, Quilchena Experimental Station.

Dairy Branch:

H. RIVE, B.S.A., Commissioner.
F. OVERLAND, Dairy Instructor and Inspector.
G. H. THORNBERRY, Cow-tester.

Foul-brood Inspectors:

W. J. SHEPPARD, Chief Inspector (Nelson).
F. D. TODD (Victoria).
W. H. TURNBULL (Lower Mainland).
A. W. FINLAY (Lower Mainland).

Publications Branch:

*R. J. FERRIS, Editor.

General:

A. H. SHOTBOLT, General Assistant.
D. E. MACKERETH, Carpenter.

Accountant's Branch:

W. T. ANDREWS, Chief Accountant.
W. H. THORNBORROW, Assistant Accountant.
C. P. L. PEARSON, Assistant Accountant.

Clerical:

R. E. MITCHELL.	A. E. HILL.	K. MCRAE.
F. H. DAVEY.	F. L. BROOKS.	M. WALSH.
A. J. HOURSTON.	G. LINDSAY.	L. LEES.
V. TONKS.	V. M. BRAKES.	G. HAWES.
J. A. SMITH.	M. LAUDER.	M. HICKS.
E. CLARKE.	A. P. WOODWARD.	E. DRUMMOND.

Women's Institutes:

MRS. V. S. MACLACHLAN, Secretary.

* Resigned during the year.

An Okanagan orchard in full bloom.

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REPORT OF DEPARTMENT OF AGRICULTURE.

REPORT OF THE DEPUTY MINISTER OF AGRICULTURE.

D. Warnock, F.R.C.V.S., O.B.E.

Hon. E. D. Barrow,
Minister of Agriculture, Victoria, B.C.

Sir,—I have the honour to submit herewith the report of the Department of Agriculture for the year 1921.

The estimated value of agricultural production for the year 1921 is $59,742,994, as compared with $68,926,090 for the year 1920, being a decrease of $9,183,096, or 13.32 per cent. In nearly all lines of agriculture marked increases are to be noted in the quantities produced; owing to the prevailing low prices, however, it was only to be expected that the actual value of production would show a considerable decrease. Imports of agricultural products from other Provinces in Canada are valued at $15,329,478, as against $18,902,981 in 1920, while imports from foreign points decreased from $7,913,488 to $5,640,943. The total decrease in the value of all imports would therefore be $5,846,048, or 21.80 per cent.

Live-stock statistics place the value of all domestic animals at $14,152,749, representing an increased value of $137,876. Beef cattle increased in numbers 5,082; dairy cattle, 6,702; sheep, 4,984; and goats, 1,160; while the numbers of swine decreased 2,488. The production of all meats amounted to 23,235,794 lb. valued at $2,812,298, as against 23,302,000 lb. valued at $4,217,212 in 1920. The dressed cost of beef decreased in value from 17.6 cents in 1920 to 11.28 cents in 1921; pork and pork products from 20.9 to 18.54 cents; and mutton from 21.5 to 16.05 cents. The total value of all poultry products is placed at $3,621,107, representing a decreased value of $536,587. Poultry shows an increase during the year of 880,337 lb. The average price for the year dropped from 35 to 32 cents per pound. Egg production increased by 290,677 dozen. The average price per dozen was placed at 41 cents, as compared with 60 cents in 1920. The value of all dairy products was $6,596,208, as against $7,184,060 in 1920. There was an increase of 846,558 lb. in butter produced, the total production being 3,521,002 lb. The average price of creamery butter in 1921 was 45.3 cents per pound, while the price in 1920 was 64.7 cents. The total quantity of cheese manufactured was 421,314 lb., an increase of 67,261 lb. during the year. Due to the prevailing low prices there was a falling-off in the total value of $22,793. The quantity of fresh milk consumed was 9,059,450 gallons, being 151,140 gallons more than the previous year. The average price per gallon in 1921 was 42 cents, whilst the average for 1920 was 46 cents. Ice-cream manufactured was 13,233 gallons less than in 1920.

The records of the Provincial Statistician show with regard to fruit production that the total value of the 1921 crop was $6,504,850, or 15 per cent. greater than in 1920. The fruit-crop was the largest on record, apple production alone being estimated at 4,279 cars, or nearly double that of 1920. The small-fruit crop was approximately 90 per cent. greater than the preceding year.

The total vegetable-crop amounted to 196,022 tons, or 17,407 less than in 1920. The value of all vegetables produced was $6,484,383, as compared with $8,898,919 in 1920. Fodder-crops aggregating a total of 643,488 tons valued at $13,329,420 were produced. This represents an increase of 77,951 tons, but with the low price prevailing the total value was $4,081,432 less than in 1920. Clover and timothy averaged $23.68 per ton, as against $35 in 1920. The total production of grain-crops is placed at 4,688,805 bushels valued at $3,785,332, representing an increased production of 1,322,130 bushels, or 39 per cent. There was a decline in the prices of all grains of over 50 per cent. Of the miscellaneous crops, honey showed an increase of 83,404 lb.; the total value of the crop was $89,631. The quantity of goats' milk produced was 32,883 gallons greater than in 1920.

Appended hereto are the reports of branches and staff officials outlining in detail their respective activities.

Respectfully submitted.

D. Warnock,
Deputy Minister.

REPORT OF DEPARTMENTAL SECRETARY.

WM. J. BONAVIA.

Dr. D. Warnock, F.R.C.V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I have the honour to submit herewith my annual report as Secretary of the Department for the year 1921.

STAFF.

The Estimates for the fiscal year ending March 31st, 1922, provided for seventy-five appointments, forty-eight technical and twenty-seven clerical.

New appointments were made to the Horticultural, Dairy, and Live Stock Branches, the attached table giving full details:—

Staff Appointments, 1921.

Date.	Name.	Appointment.	Remarks.
1921.	*General Office.*		
April 1	W. H. Thornborrow	Accountant.	
July 4	Miss M. Moffat	Stenographer.	
Sept. 24	L. Johnson	Boy Clerk	Transferred from "Agricultural Instruction Act."
	Dairy Branch.		
Feb. 1	F. Overland	Dairy Instructor.	
	Horticultural Branch.		
,, 1	R. P. Murray	District Field Inspector.	
May 20	F. L. Goodman	District Horticulturist.	
	Live Stock Branch.		
April 5	Miss H. Leighton	Stenographer.	
May 1	Chas. Good	District Poultry Instructor.	
,, 1	Chas. W. Traves	District Poultry Instructor.	
Nov. 17	Angus L. Hay	District Agriculturist.	

Resignations.

Date.	Name.	Appointment.	Remarks.
Feb. 28	Robert Murray	Clerk, Live Stock Branch	Private business.
Sept. 24	E. A. Raines	Boy Clerk	,,

Temporary Appointments to Staff.

Stenographers, 6; Assistant to Plant Pathologist, 1; Horticultural Branch Inspectors *re* Fire-blight, 2; Horticultural Branch Inspectors *re* Codling-moth, 22.

"*Agricultural Instruction Act.*"—A number of seasonal appointments were again made under the sections of this Act, as follows: Apiary Inspectors, 4; Poultryman, 1; Assistant Entomologists, 3; Foreman, Dry Farm, 1; Messenger, 1. Also Supervisors and Testers for several Cow-testing Associations.

CORRESPONDENCE.

The total figures of letters received and dispatched were practically similar to those for the previous year, the inward letters being 27,959 and outward 28,220.

In this office there was a noticeable increase of 90 per cent. in the Farmers' Institute section, whilst the outward letters totalled 9,932, as against 8,318 the previous year.

Live Stock, Poultry, and Soil and Crop correspondence all show substantial increases. (Appendix No. 1 gives full details).

Circular Letters.—Stencilled circular letters, which form an important means of official notification, totalled 37,676, grouped as follows:—

Agricultural Associations	280
Farmers' Institutes	4,045
Dairy Branch	3,631
Horticultural Branch	5,890
Live Stock Branch—	
Brand Recorder	1,000
British Columbia Goat-breeders' Association	1,890
British Columbia Stock-breeders' Association	550
Soil and Crop Division	1,530
Poultry Division	7,870
Miscellaneous	3,250
Statistics	2,280
Women's Institutes	5,460
Total	37,676

Bee Registration.

A voluminous correspondence occurred during the year with bee-keepers, requesting inspection or protesting against compulsory registration under the "Apiaries Act Amendment Act" of 1920.

Official records showed 1,065 registrations for 1921, as against 1,121 and 1,193 for the years 1920 and 1921 respectively.

By a further amendment to the "Apiaries Act" at the second session this year the objectionable registration clause was deleted.

Pound Districts, Grazing Districts, and Sheep-protection Districts.

Pound Districts.—During the past year applications for six pound districts were received in the Department; Gray Creek District being constituted on June 23rd and Castlegar District on October 22nd.

A pound district at Rolla, in the Peace River Block, covering a wide area was refused after investigation, and applications for Okanagan Landing, the Commonage near Vernon, and Trail East were still under consideration at the close of the year.

The total number of pound districts organized is now thirty-three.

Grazing Districts.—The 1920 amendment to the "Animals Act," making provision for the defining of areas where bulls of a good beef type over 1 year old might be allowed to run at large during certain periods of the year, was taken advantage of by several Stock-breeders' Associations, and after consultation with the Grazing Commissioner the following districts were proclaimed:—

January 7th, North Fork of Kettle River, June 20th in each year to March 1st in next succeeding year; April 28th, Ashcroft, May 1st to December 31st in each year; April 28th, Cariboo-Kamloops-Nicola, July 1st to December 31st in each year; April 28th, Okanagan-Keremeos, June 15th to December 31st in each year.

Sheep-protection Districts.—Following dissensions amongst the settlers, the Hon. the Minister of Agriculture recommended that the Howe Sound Sheep-protection District be cancelled.

The boundaries of the Langley Sheep-protection District were redefined and a Proclamation issued on April 29th.

Sale of Agricultural and Horticultural Poisons.

The regulations made under the provisions of the "Poisons Act, 1909," and the "Pharmacy Act, 1911," had not been enforced hitherto to any extent, but following representations made by the Pharmaceutical Association of British Columbia with regard to the unlicensed sale by hardware merchants, feed-houses, etc., of agricultural poisons, the Hon. the Minister of Agriculture reissued regulations dealing with such licences on July 26th.

Briefly put, a licence of $5 per annum and a record of purchaser and sales is required for the sale in open shops of poisonous substances used exclusively in agriculture or horticulture

for the destruction of insects, fungi, or bacteria, or sheep-dips or weed-killers—namely, arsenate of lead, Paris green, London purple, hellebore, tobacco extract, sulphate of copper and iron.

A mailing-list of some 700 names was prepared through the co-operation of Department officials and Government Agents, etc. The Superintendent of Provincial Police was also furnished with instructions and a supply of notices.

By the close of the year considerable correspondence had taken place and a number of licences were applied for.

FARMERS' INSTITUTES.

The past year has witnessed quite a revival amongst Farmers' Institutes; not only have the older-established ones taken on a new lease of life, but several that were in a dormant condition since the war have renewed activity with increasing membership, and twelve entirely new institutes have organized during the year, with an average membership of thirty-one each, as follows:—

Date.	Name.	Membership.
April 25	Winfield	27
May 27	Salmon River	45
,, 27	Avola	18
,, 31	Hornby Island	28
June 7	Osland	13
,, 11	Fern Ridge	43
July 20	Stuart River	25
,, 28	Qualicum District	35
Dec. 9	Coghlan District	47
,, 21	East Sooke	19
,, 27	Trout Creek	35
,, 29	North-east Burnaby	44

The total number of Farmers' Institutes in good standing at the close of the year was 135, with a membership of 5,261. Eleven institutes had over 100 members recorded, as follows:—

Delta	169	Central Park	124
Mission City	160	Comox	119
Arrow Park	145	Nechako	113
Victoria	141	Bella Coola	109
Coquitlam	126	Nanaimo	109
Islands	125	Kootenay Lake	103

Fairs held by Farmers' Institutes.—A steadily increasing number of institutes are holding fall fairs each year in districts where no special Agricultural Association is located. The Department was able to supply judges for the majority of the following events:—

September 2nd, Gibson's Landing; September 5th, Squamish; September 9th, Whonnock; September 10th, Sayward; September 16th, Mapes; September 20th, Boswell; September 23rd, Denman Island; September 23rd, McBride; September 30th, Forest Grove; October 1st, Arrow Park; October 6th, Peachland; October 7th, Kaslo; October 7th, Rock Creek.

Lectures and Demonstrations.—With the renewal of institute activity has come an increased call upon the Department for lectures and demonstrations in small fruits and vegetables, potato-improvement, poultry and live stock.

Amongst the institutes visited by officials from headquarters were: Abbotsford, Comox, Coombs, Cowichan, Howe Sound, Islands, Ladysmith, Langley, Metchosin, Nanaimo-Cedar, Qualicum District, Shawnigan, Sooke, Texada Island, Victoria, Whaletown, and Whonnock.

A highly successful lecture tour was also arranged in November and December for Geo. C. Hay (Kamloops) and C. W. Traves (Grand Forks), with the co-operation of A. Morton (Dominion Live Stock Branch), which included sixteen Farmers' Institutes in the North Thompson Valley and Canadian Pacific Railway Main Line District between Kamloops and Golden. Poultry, sheep-raising, and mixed farming were the subjects; attendances and interest shown were extremely satisfactory.

Stumping-powder for Land-clearing.—By an amendment (chapter 2) to the "Agricultural Act" of 1915, at the first session of 1921, the supply of stumping-powder for land-clearing by the Department at wholesale rates to members of Farmers' Institutes was extended to any association

or society incorporated under any Act of the Legislature carrying on work of substantially the same character.

A further special means of aiding farmers in clearing stump lands was provided by the Hon. the Minister of Agriculture when he was successful in obtaining legislative authority for a grant of $30,000 for the payment of rebates on powder used after April 1st. The regulations issued were as follows:—

(*a.*) Applicants shall be *bona-fide* owners or lessees of lands in respect to which applications are made and clearing operations shall have been carried on for agricultural purposes only.

(*b.*) Grants will be paid on a basis of not more than ten cases of powder to each applicant and not more than five cases for each acre prepared for production thereby.

(*c.*) Applicants shall sign declarations, upon forms supplied by the Department of Agriculture, setting forth the legal description of the land upon which the powder has been used, the number of cases of explosives actually used in the clearing operations, and the number of acres of land upon which the work has been carried on.

(*d.*) Applications shall be signed in the presence of and witnessed by one of the following persons: Secretary of Farmers' Institute; Secretary of any association or society, incorporated under any Act of the Legislature, carrying on work of substantially the same character as that carried on by Farmers' Institutes; any official of the Provincial Government of British Columbia.

(*e.*) Upon receipt at the Department of Agriculture of such declaration and application form, with invoice of powder purchased, rebate will be made upon a basis of $2.50 per case to the extent set out in clause (*b*) of these regulations.

The prices of stumping-powder have ranged downwards during the year from $15.35 per 100 lb. to $13.50 at the close of the year.

Year.	Supplied by C.X.L. to Farmers' Institutes.	Supplied by Giant Powder Co. to F.I.	Total.
	Cases.	Cases.	
1920	5,314	6,193	11,507
1921	7,087	7,489	14,576

Advisory Board of Farmers' Institutes.—The year was marked by the death of A. D. Clyde, of Robson, member for District H, and the retirement of A. B. Smith, Cranbrook (District I). The vacancies have been filled by O. B. Appleton, Procter, and A. Taylor, Wilmer.

Districts F and H also were amalgamated, there being now eight members on the Board.

Co-operative Activities of Farmers' Institutes.—Owing to inevitable delays in checking up 1920 returns the figures for that year have not hitherto been available or published. Of the 130 institutes in existence at the close of 1920, twenty-five were actively engaged in buying various commodities for their members, such as stumping-powder, fuse and caps, seed, feed, flour, hay, oil, sugar, etc.; whilst transactions on a smaller scale were made by some fifty others.

The following table gives an idea of the business done by the twelve institutes with the biggest turnover:—

Name.	Receipts.	Expenditures.	Mainly for
Similkameen	$13,817 14	$13,617 88	Feed, flour, and general supplies.
Crawford Bay	8,999 59	7,868 72	" "
Maple Ridge	8,748 26	8,314 53	Stumping-powder, fuse and caps.
Chilliwack	7,141 36	7,059 35	" "
Aldergrove	5,776 65	5,017 21	" "
Spallumcheen	4,663 61	4,605 14	Powder, fuse and caps, and pure-bred stock.
Northern Okanagan	3,874 15	3,420 38	Stumping-powder, fuse and caps, and cement.
Gray Creek	2,311 24	2,149 93	Feed, flour, building feed-house, and shipping apples.
Kent	2,292 31	2,095 06	Powder, seed, and wire.
White Creek Valley	2,122 68	2,032 43	Feed and supplies and powder.
Lytton	2,033 30	1,919 28	Feed and miscellaneous supplies.
Burquitlam	1,835 24	1,697 51	District exhibits and prize-money for Agricultural Fair.

Other interesting lines of co-operative work included: 5,000 apple-boxes bought by the Arrow Lakes Farmers' Institute; $1,161.40 spent for fertilizer by the Grand Forks Farmers' Institute; $349.54 refunded by the Malcolm Island Farmers' Institute for pure-bred stock.

These are only a few of many instances of the valuable work being carried on by these organizations.

WOMEN'S INSTITUTES.

Great activity has been shown in this branch of departmental work; the record number of twenty new institutes having received certificates of incorporation during the year, as follows:—

Date.	Name.	Membership.
Jan. 22	Cawston	40
Feb. 5	Langley Prairie	43
,, 7	Okanagan Falls	19
,, 7	Pitt Meadows	42
,, 15	Fruitvale	30
,, 18	Hornby Island	19
,, 24	Valdes Island	28
,, 25	Barnston Island	16
March 8	Woods Lake	39
,, 9	Lazo	22
,, 24	Lumby and District	29
,, 29	Granby	32
April 26	Esquimalt	52
June 8	Lynn Valley	52
,, 8	Merville	18
,, 22	Victoria	36
Aug. 20	Otter District	20
Dec. 13	Coghlan and County Line	..
,, 13	Royal Oak	..
,, 13	South Hill and North Arm	..

The total number of institutes in existence are now 93, with a membership of 3,454.

Flower-shows, Exhibits of Women's Work, etc.—Fifty-four of the above events were organized, this also constituting a record, being an increase of eight over the previous year.

Roughly classified, forty-six institutes held flower-shows, with exhibits of women's and school-children's work, one held a bulb-show on Vancouver Island, and seven held baby clinics and health exhibits.

Many of these flower-shows included numerous exhibits of small fruits and vegetables and the Horticultural Branch was able to provide a judge in six instances where the importance warranted same. (*See* Appendix No. 2 for details.)

PUBLICATIONS.

Following the resignation of R. J. Ferris on March 17th, the supervision of the work of the Publications Branch reverted to the writer, with the exception of the preparation and editing of the monthly *Agricultural Journal.*

The past year has not seen so many new issues as in 1920, but many of the standard bulletins have been revised and reissued.

A new edition of 15,000 copies of Bulletin 8 on "Agriculture in B.C." was published in April, there being a constant heavy demand for same; the first bulletin on "Fertilizers" to be issued in this Province was prepared by W. Newton; whilst two interesting circulars compiled by University officials were published by this Department as No. 36, "A Preliminary Report on 45 Dairy Farms in the Chilliwack, Courtenay, and Ladner Districts," and No. 38, "The Cost of producing Apples in the Okanagan."

Following a decision of the Hon. the Minister of Agriculture, it was decided to discontinue the free issue to farmers of the *Agricultural Journal* after the June number. This step was taken after consultation with the Advisory Board of Farmers' Institutes and with the feeling that the time had come when the farming community of the Province should bear a proportion of the cost of the *Journal* if it had been found worthy of support.

All members of Farmers' and Women's Institutes, Fruit-growers' Associations, etc., are now entitled to receive the *Journal* for 50 cents per annum, whilst the public rate remains at $1.

The effect of the new policy was at once reflected in the circulation, which averaged 8,483 per month for the first half of the year and 2,350 per month for the latter half. There are evidences, however, that the paid circulation is increasing at the close of the year.

The following statement shows the total number of bulletins, circulars, etc., printed by the Department during 1921:—

Date.	Name.	Description.	No.
1921.	*Bulletins.*		
Jan. 7	Sheep-raising in B.C. (2nd Ed.)	Bulletin No. 77	5,000
„ 29	Goat-raising in B.C. (3rd Ed.)	„ 64	5,000
April 2	Fertilizers	„ 87	5,000
„ 2	Agriculture in B.C. (2nd Ed.)	„ 8	15,000
„ 13	Climate of B.C. (6th Ed.)	„ 27	4,000
„ 18	Agricultural Statistics, 1920	„ 88	1,200
Aug. 1	Natural and Artificial Incubation and Brooding (4th Ed.)	„ 39	5,000
	Horticultural Circulars.		40,200
Mar. 4	Planting Plans and Distances	Hort. Circ. No. 62	1,000
„ 30	Currant and Gooseberry Culture (2nd Ed.)	„ 56	2,000
April 14	Peach-twig Borer (3rd Ed.)	„ 31	2,000
„ 14	Strawberry-root Weevil (3rd Ed.)	„ 33	2,000
„ 14	Woolly Aphid of the Apple (2nd Ed.)	„ 34	2,000
„ 14	Currant Gall-mite (2nd Ed.)	„ 35	1,000
„ 14	Onion-thrips (3rd Ed.)	„ 36	2,500
„ 14	Imported Cabbage-worm (2nd Ed.)	„ 37	2,500
„ 14	The Lesser Apple-worm (2nd Ed.)	„ 38	3,000
„ 14	Apple Aphides (2nd Ed.)	„ 39	3,000
„ 14	Soap Solutions for Spraying (2nd Ed.)	„ 40	2,000
„ 14	Oyster-shell Scale (2nd Ed.)	„ 41	3,000
„ 14	Diseases of Stone-fruits (2nd Ed.)	„ 52	3,000
„ 18	Locust-control	„ 63	2,000
May 6	Gardening on a City Lot (Revised Ed.)	„ 43	3,000
Aug. 11	Selection of Orchard Sites and Soils (3rd Ed.)	„ 53	2,000
Dec. 6	Methods of Fruit Picking and Handling (Revised)	„ 27	1,000
„ 6	Planting Plans and Distances (Revised)	„ 62	2,000
„ 6	Blackberry Culture	„ 57	10,000
„ 29	Strawberry Culture	„ 58	10,000
	Circular Bulletins.		59,000
April 13	Poultry Rations, etc. (Revised)	Circ. Bull. No. 19	5,000
„ 18	T.B. in Poultry (2nd Ed.)	„ 2	5,000
	Agricultural Department Circulars.		10,000
Jan. 4	Potato Certification in B.C.	Agri. Dept. Circ. No. 32	1,000
„ 27	Vancouver Island and Gulf Islands	„ 33	2,500
Mar. 31	Agriculture in West Kootenay	„ 34	2,500
April 7	How to pack Nursery Stock, etc.	„ 35	1,000
„ 13	Preliminary Report on 45 Dairy Farms, etc.	„ 36	4,000
June 14	Hints to Exhibitors at Fall Fairs (2nd Ed.)	„ 29	1,000
„ 29	Some Good Egg Recipes	„ 37	5,000
July 29	The Cost of producing Apples in the Okanagan	„ 38	4,000
	Dairy Circulars, etc.		21,000
Feb. 28	Starters for Farm Cheese-making	Dairy Circ. No. 1	4,000
„ 28	Farm Cheese	„ 2	4,000
„ 28	Cottage Cheese	„ 3	4,000
„ 28	Clotted Cream	„ 4	4,000
July 4	*Re* "Creameries and Dairies Regulation Act"	Leaflet	500
Nov. 1	Varying Butter-fat Tests	Dairy Circ. No. 5	5,000
			21,500

PUBLICATIONS—*Continued.*

Date.	Name.	Description.	No.
	Miscellaneous.		
May 10	Some Questions and Answers *re* B.C. (Revised)	Leaflet	2,500
,, 23	Regulations for Farmers' Institutes (Revised)	,,	3,000
,, 23	By-laws for Farmers' Institutes	,,	2,000
June 11	*Re* Standard Varieties of Potatoes	Charts	200
,, 11	*Re* Potato-diseases	,,	200
July 25	Bee-keepers' Calendar	Posters	1,000
Aug. 4	"Sheep Protection Act"	,,	250
,, 13	Farm Account Book (2nd Ed.)		1,000
Sept. 7	*Re* Colorado Beetle	Leaflet	100
,, 20	The Grasshopper and the Range	,,	100
			10,350
	Reports.		
May 11	15th Annual Report of Department of Agriculture	Year 1920	1,000
June 20	Entomological Society of B.C.	Proceedings Nos. 13 and 15	500
			1,500
	Agricultural Journal.		
1920.	Agricultural Journal	Month of January	9,600
Dec. 29	,,	,, February	9,300
Jan. 28	,,	,, March	8,200
Feb. 28	,,	,, April	7,800
April 1	,,	,, May	8,000
1921.	,,	,, June	8,000
April 26	,,	,, July	2,500
May 19	,,	,, August	2,500
June 28	,,	,, September	2,300
Aug. 1	,,	,, October	2,500
Sept. 25	,,	,, November	2,300
Oct. 1	,,	,, December	2,300
,, 31			
Nov. 25			65,300
	Grand total		238,850

Bulletins and Circulars mailed or otherwise distributed during 1921.—A grand total of 166,796 were sent out in the year, this being almost 25,000 more than in 1920 and constituting a record.

BRITISH COLUMBIA STUDENTS.

Only five British Columbia students were paid grants at Eastern colleges; these cases all being those of students who were taking their final year in Home Economics or Agriculture, as follows:—

Ontario Agricultural College.—Miss C. E. Maxwell, New Westminster (Home Economics); Miss M. Grant, Vancouver (Home Economics); A. Fulton, Lumby (Agriculture).

Manitoba College.—Miss G. Hallwright, Victoria (Home Economics).

University of Toronto.—Miss L. E. King, Prince Rupert (Home Economics).

Respectfully submitted.

WM. J. BONAVIA,
Secretary.

A typical scene in one of the Land Settlement Board's areas in the Cariboo District. (Slash piled ready for burning.)

Slashing, piling, clearing, and breaking. There were 10 acres cleared and broken by two men and three-horse team in three months. Cariboo District. Land Settlement Board.

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REPORT OF DEPARTMENTAL SECRETARY *RE* FALL FAIRS.

Wm. J. Bonavia.

Dr. D. Warnock, F.R.C.V.S., O.B.E.,
Deputy Minister of Agriculture, Department of Victoria, B.C.

Sir,—I have the honour to report as follows with regard to the fall fairs held in the Province by Agricultural Associations during 1921:—

It may be stated that in general the fall fairs showed a great deal of improvement, due no doubt to a revival of interest following the return to more normal times.

The three big Coast exhibitions at Vancouver, Victoria, and New Westminster each had many strong features of interest and fully maintained their standards; probably the increase in live-stock exhibits with many British Columbia bred animals of outstanding merit was one of the most noticeable features.

Fruit sections in the Vancouver Island and Lower Mainland district fairs were not up to normal owing to the poor fruit-year experienced.

In the Upper Country the success of the Salmon Arm and Creston Fairs was notable.

During the year two new Agricultural Associations were incorporated—the Terrace District Fall Fair Association in February and the Lumby District Agricultural Society in October.

In February a meeting of the British Columbia Fairs Association was called at Vancouver after a lapse of several years, and the delegates assembled decided to incorporate under the "Societies Act," a charter being granted on April 21st. About three-fourths of the existing Fair Associations applied for membership during the year, and it is trusted that, in addition to handling the many matters affecting the welfare of these bodies, the dates of fall fairs in the various circuits will be more effectively arranged by mutual agreement so as to avoid overlapping.

The total number of incorporated Fair Associations is now sixty-three; of these, fifty-one held fall fairs, whilst one summer live-stock show was held (Knutsford) and one winter fat-stock show (Windermere District).

There were in addition thirteen fall shows held under the auspices of Farmers' and Women's Institutes in districts where no regular Fair Association was in existence. The Department supplied judges for these events also in the majority of cases.

Judges.—A total of seventy-three judges were provided free by the Department, there being only some two or three fairs that were not thus accommodated. The attached table shows the personnel:—

	Staff.	Outside.
Horticulture	12	3
Field crops	2	2
Live stock	4	18
Poultry	3	12
Dairy products	2	2
Honey products	2	1
Domestic science	..	10
Totals	25	48

Due recognition is hereby accorded to the valuable services rendered by several Field Supervisors of the Soldier Settlement Board who judged the live-stock exhibits at a number of fairs, also to Professors Stillwell and Hare, of the University of British Columbia; to R. G. Newton, Superintendent of the Dominion Experimental Farm at Invermere; and to S. G. Freeborn, of the Dominion Live Stock Branch, Ottawa, who judged goats at the three Coast exhibitions.

There was an unusual demand for the services of lady judges for domestic-science exhibits, ten ladies being furnished by the Department, as against four in 1920. The women's work section is now an integral part of the exhibits at many fairs and will increase in importance.

Junior Live-stock Judging Competitions.—Amongst the most interesting features of the three Coast exhibitions were the stock-judging competitions for teams of boys and girls under 18 years of age. The Department of Elementary Agricultural Education and the Department of Animal Husbandry of the University were responsible for the organization and direction of these events.

At New Westminster, where the final contests took place, eleven teams competed, the winners being from Kamloops, Armstrong, Chilliwack, and Victoria in the order named; the first prize

being a silver cup donated by the British Columbia Stock-breeders' Association, with a silver medal to each member of the team, and second prize a bronze medal to each.

Return railway or steamboat fares were provided by the Exhibition Associations.

An abstract of the regulations is as follows:—

"1. Districts: Any recognized district in the Province is eligible to enter a team in the competition; the teams preferably to be under the supervision of a local breeder, farmer, or representative of any branch of the Government service, and to have received some instruction in live-stock judging in the preparation for the contest.

"2. Each competing team shall consist of three boys or girls under 18 years of age.

"3. They will be called upon to judge three classes of live stock—namely, heavy horses, beef cattle, and dairy cattle. An effort will be made to have the classes made up of animals that are mature or as nearly so as are available.

"4. Each class will consist of four animals and 100 points will be allowed for the judging of each class, as follows: (1) Placing of animals, 50 points; (2) reasons (written), 50 points.

"5. The maximum time allowed in judging a class will be as follows: (1) Placing of animals, 15 minutes; (2) writing of reasons, 15 minutes.

"6. Each class of live stock will be judged and the reason-cards rated by a committee of three qualified judges which will be appointed by the executive of the association.

"7. Prizes will be awarded on total points made by the members of each team judging in the three classes."

Boys' and Girls' Pig Clubs organized under the Dominion Live Stock Branch showed their results and were judged at Armstrong, Chilliwack, Courtenay, Victoria, and Duncan Fairs, the prize-winners being in the order named; the Dominion and Provincial Departments of Agriculture and the local Fair Associations each providing one-third of the prize-money.

Grants.—The vote in aid of Agricultural Associations for the fiscal year ending March 31st, 1922, amounted to $41,000, and the total expenditure at the close of 1921 was as follows:—

Grants *re* prize-lists	$31,062 90
Judging and miscellaneous expenses	5,302 88
Windermere District Fat-stock Show	250 00
Grants to nine district poultry-shows	4,000 00
Total	$40,615 78

(*See* Appendix No. 3 for details of grants.)

RECOMMENDATIONS AND SUGGESTIONS BY JUDGES RE FALL FAIRS HELD IN 1921.

Collections and Displays of Vegetables.—In collections or displays of vegetables, if variety names could be placed on the different vegetables shown it would materially add to the educational value. At Coquitlam one of the collection exhibitors had the name of each variety typewritten on a small card and pinned to the vegetable, and it attracted more than passing interest.

In A.O.V. fruit classes some shows call for varieties to be named and some don't. Generally most entries are not named and what are named are often incorrectly named. It would probably, in small shows, be better not to call for varieties to be named. The judge, if he knew them and had time, could then note the varieties on the entry ticket. Many growers exhibit in this class to find out the names of their varieties. Many exhibitors do not seem to understand that A.O.V. classes are intended only for those varieties which have no class of their own.

Oversized Exhibits of Fruit and Vegetables.—Exhibitors still show a tendency to show large produce instead of choosing uniform specimens, with possibly less bulk and better quality.

Potato Classes.—Too many prize-lists are still found calling for "Long Reds," "Short Reds," "Long Whites," and "Short Whites." This is a mistake. Districts should specialize in one or two standard varieties, double up the prize-money, and have classes for only those vareties they wish to specialize in. This has been tried in the Courtenay District this year and brought forth an exhibit of potatoes equal to any in the Province.

Prize-money (Live-stock Entries).—The average prize-list attempts to cover too many breeds and too many classes. In many cases there are no entries at all for some of the classes on the prize-list. The attempt to stretch the prize-money over such a wide number of classes results in so small a sum in each class that the exhibitor is discouraged from showing. The prize is not worth the trouble.

Management of the Judging-ring, etc.—The following suggestions were drawn up by a judge after visiting several of the smaller fairs where a proper routine had not been established, or where live-stock entries had not previously been so important:—

(*a.*) One man should be allotted to calling the classes that these may appear promptly before the judge.

(*b.*) The prize-book should contain the individual entry number; the clerk and the judges would then be sure when all exhibits were in place for judging.

(*c.*) There should be definite rules in connection with the time stock should arrive on the ground; this is especially necessary in a two- or three-day fair.

(*d.*) Horse classes: In Interior districts heavy draught horses appear somewhat light, as they are judged from a standpoint of 1,600 lb. It is suggested that in such districts the prize-list be altered so as to limit the agricultural class from 1,300 to 1,500 lb. instead of 1,600 lb.; to make the general-purpose class from 1,100 to 1,300 lb. and confine it to one class mare or gelding 4 years and up, to be ridden as well as driven. This is a useful third horse for a farmer and would necessitate good shoulders and define the general-purpose type. A judge considers the money given for brood classes for general purpose frequently wasted and it might well be concentrated on the one class.

(*e.*) Championships (horses): A championship given for *any* breed stallion does not help the live-stock industry. It would be better fostered if ribbons were offered for championships under the various breeds and no money unless there was competition between breeds.

Hogs and Sheep.—It is a most difficult thing to judge breed against breed for championships. In the case of hogs it is bacon type against lard type, and in the case of sheep, sometimes, mutton against wool.

Special Prizes.—Special prizes could be best handled by the Directorate as follows: It is sometimes possible for an inferior animal, for lack of competition, to clean up not only the society money, but a number of specials in various classes as well. This could be overcome very satisfactorily if the Directorate were to ask the donor's permission to name the class for which the prize might be given and obtain his consent after the class is named. Also, the Directorate might draw up a number of classes which they consider worthy of specials and submit them to the public, asking for specials to be given to any of the following classes. Where duplication occurred, in most cases one of the donors would be willing to transfer his prize to another class.

Women's Work.

Arrangement and Grouping of Women's Work.—At some of the fairs the Directors seem to fully realize the great educational value of the work sent in by exhibitors in giving it the position it is due in the general display by proper arrangement and grouping. This will stimulate casual observers to become exhibitors at a future date. But it is regrettable that at other fairs this is not the case, for it is of foremost importance. In selecting articles for display exhibitors are often haphazard.

Baking.—Generally speaking, the bread and small bread—e.g., buns, biscuits—were only good. When exhibiting, loaves should be of a standard weight. Brown bread was distinctly poor everywhere in blending, mixing, baking, and flavour.

Oatcakes and oatmeal cookies are constantly confused and the recipes used are very poor. The value of the former in the diet cannot possibly be overestimated for children and adults. Housewives should realize this, learn to make them properly, and use them unsparingly at meals, and no baking section should be complete without a place for them.

Pastry-making, with a few exceptions, was poor. The women need particular instruction in this in a country where pies enter so largely in the menu.

Canning and Preserving.—It is extravagance of food, labour, and time to attempt canning unless the essentials are understood, the process properly gone through, and the sealing effectual. There have been faults of this kind (some few, some many) at every fair visited this year.

Again, the principles of jam-making, jelly-making, and marmalade-making are not generally understood. One does not deny that some exhibitors sent in excellent specimens.

Dairy Produce.—It does not seem to be generally understood that marketable food, such as eggs and honey (in section), should be put on the market scrupulously clean; and even the way the wrapping-paper is put on butter is noted by the discriminating purchaser.

Needlework.—Some of the needlework was extremely well done, but one would like to see a more up-to-date standard of needlework and more "quickly-made" garments. Those in country communities should become acquainted with the many simple patterns and garments to be used at the present time and the effective embroideries to be applied. They would find labour lessened and refreshment given.

Children's Section.—This section would be of greater educational value if, as at some fairs, such simple articles as handkerchiefs, doilies, aprons, iron-holders, and tea-cloths with a loop attached were asked for.

Correct interpretation of the classes should be made when exhibits are entered; e.g., a "set" is a "set" and not an assortment; filet lace and filet crochet should not be confused.

At some fairs a few of the exhibitors resented the opening of sealed jars by the judge for final tests in judging. Without opening these jars it would be impossible to give the awards where they belong.

Respectfully submitted.

WM. J. BONAVIA,
Secretary.

REPORT OF PROVINCIAL HORTICULTURIST AND INSPECTOR OF FRUIT PESTS.

W. H. ROBERTSON, B.S.A.

Dr. D. Warnock, F.R.C.V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I herewith beg to submit my report for 1921 as District Horticulturist for the Lower Mainland from January 1st to March 31st and as Provincial Horticulturist and Inspector of Fruit Pests from April 1st to December 31st.

CHANGES IN STAFF.

On April 1st your District Horticulturist for the Lower Mainland was appointed to the position of Provincial Horticulturist and Inspector of Fruit Pests, a position which had been vacant since 1918. The position left vacant in the Lower Mainland District was filled by F. L. Goodman, who previous to the war had been connected with the Horticultural staff at Nelson.

HORTICULTURAL CONDITIONS IN BRITISH COLUMBIA.

From a horticultural standpoint the conditions in British Columbia during the past year have been discouraging. A very mild winter permitted both tree and small fruits to come through satisfactorily. A late spring, however, in the small-fruit sections, followed by heavy rains during the picking season, seriously interfered with shipments, particularly strawberries.

The crop of small fruits on the whole was from the standpoint of production satisfactory, and as the acreage devoted to these fruits was considerably in excess of previous years the production was the heaviest on record.

Conditions in the large-fruit districts of the Okanagan and the Kootenays were most satisfactory. There was a small loss due to a heavy frost during the blossom period and certain sections also suffered from a hail-storm during the summer. In the Okanagan also there was a heavy loss during the picking season from a wind-storm. Even with these losses, however, the output was the heaviest on record. Although the output in both small and tree fruits was larger than in any year in the history of the Province, the prices when compared with the abnormal prices received during the two previous years were very low. This no doubt has had a discouraging effect on fruit-growers, and particularly on men who were engaged but a short time in the growing of small fruits. The drop in prices, while probably not anticipated, was a natural consequence of the general tendency in the drop of all commodities which has been prevailing during the last eighteen months.

LECTURES AND SHORT COURSES.

During the early part of the year a series of short courses were held throughout the Okanagan Valley. While these were inaugurated by the Horticultural Branch, the staff of this Branch were assisted by Dominion and University officials, as well as by officials from other

branches of this Department. Meetings were held at twelve points with a total attendance of 3,316. Other meetings were held at various points throughout the Province. These were usually under the auspices of a farmers' organization, such as the United Farmers, the Farmers' Institute, or the British Columbia Fruit-growers' Association. Meetings of this kind are greatly appreciated by the growers and their interest is evidenced by the excellent attendance.

DEMONSTRATION-WORK.

Gordon Head Strawberry-plot.—This plot, which consists of 6 acres, located at Gordon Head, Vancouver Island, was started in 1919 for the purpose of demonstrating the most suitable methods of combating the strawberry-root weevil (*Otiorhynchus ovatus* Linn.). Work has been carried on by E. W. White, District Horticulturist, and W. Downes, Assistant Dominion Entomologist. Results have been very satisfactory and it is intended to carry on this work for a further period. A detailed account of this plot may be found in Mr. White's report, which is attached.

STRAWBERRY-PACKING DEMONSTRATIONS.

Strawberry-packing demonstrations were held for the first time in 1921. As the acreage set out was larger than at any other time in the history of the Province, and as there were a large number of growers who were inexperienced in the shipping of strawberries, it was thought advisable to give instruction in the preparation and packing of shipping stock. This was done at various points on the Lower Mainland and Vancouver Island, instruction being given in the field during the picking of the berries.

The results were most satisfactory, a total of 383 people attending. Your officials were assisted in this work by University and Dominion officials.

SPRAYING DEMONSTRATIONS.

Spraying-work along various lines has been carried out during the past year. From the demonstration standpoint the most important was the work done on Vancouver Island for the control of apple-tree anthracnose and in the Interior fruit sections for the control of apple-scab and blister-mite. Very satisfactory results have been obtained, and it is intended to continue some of this work during the coming season, as well as along other lines which are beginning to demand attention.

SOIL-DEMONSTRATION WORK.

With the increasing demand made upon our orchard soils by trees which are just coming into bearing or have been bearing for a number of years, it has become apparent to the fruit-growers that the plant-food constituents in the soil must be replenished and the physical condition of the soil maintained. With these facts in mind, the Horticultural Branch has established plots at various points in the Okanagan and Kootenays where various cover-crops are being used as well as chemical fertilizers. The operations on these plots are being closely followed by the growers and many of them have already adopted certain cover-crops and fertilizing methods which have been shown to be satisfactory. It is the intention of your Branch to carry out further work along this line, and it is expected that results will be obtained which will be of value to the fruit-growing industry of the Province.

THINNING DEMONSTRATION.

Because of the heavy setting of apples in the Okanagan during the past season it was thought advisable by your staff to carry out work along the line of thinning. Thinning demonstrations were held at various points throughout the Okanagan for the purpose of showing the growers the system of thinning that should be followed in order to increase the size and quality of their fruit. Plots were also established at various points where work was carried on to demonstrate the advantage of thinning, as well as to secure data on the time most suitable for this work and distance of thinning. This work will again be carried on next year.

PEST-CONTROL AND INSPECTION WORK.

Codling-moth.—During the past year work has been carried out at various points in the control of codling-moth. At two points—namely, Westbank and Vernon Town Areas—the moth has been eradicated and these places will be released from quarantine. Other areas will still, however, be kept under quarantine, as well as an additional area in the Kelowna section. It is

estimated that approximately 900 acres will be subject to control measures during the coming year, when the measures of quarantine and spraying as followed during the previous years will be carried out. Inspection of refrigerator-cars will also be continued, and it is intended to institute a system of superheating all refrigerator-cars entering the Okanagan Valley. This will be done at the divisional points of Kamloops and Revelstoke.

Fire-blight.—The attacks of fire-blight have during the past year been the most serious on record. In order to arouse the growers to the necessity for action a series of meetings dealing with both codling-moth and fire-blight were held in the Okanagan in the fall.

The growers were advised at these meetings as to the best methods of cutting out the blight and the most satisfactory disinfectants to use. They were also told that as soon as they had gone over their orchards and removed all blight-infections their orchards would be inspected by a Government official, and if no blight could be found they would be given a card stating that inspection had been completed and that their orchard was, as far as could be ascertained, free from blight. This work was started in the fall and will be continued during the coming year.

Fire-blight was also found at one or two points in the Kootenays. The areas, however, are small and little or no trouble is expected in controlling it.

Blister-mite.—This insect pest has been more noticeable during the past season than at any previous time, and as it attacks both apple and pear it is becoming of increasing importance. Control-work is being carried out and it is hoped that this Branch will be able to carry on work next year with a view to its control.

Powdery Mildew.—Up to the present its effect on the grade of apples produced has not been important. However, the work of this disease is becoming so serious in the larger fruit-growing sections to the south, and as it has already made its appearance in several of our fruit sections, it is the intention of your Branch to carry on experimental control measures in the future. In this work we will co-operate with the Dominion Experimental Farm at Summerland.

Nursery Inspection.—In order to protect the grower and to ensure his procuring nursery stock that is as far as possible free from disease and insect pests, it has been the policy of your Horticultural Branch to inspect as far as possible all nurseries. This work has been carried on during the past year in various parts of the Province by the men on the Horticultural staff stationed in the various districts. Inspection is made of each individual tree and those found affected in any way are destroyed at once, thus eliminating the possibility of these being included with healthy stock. Reports handed in by the Inspectors show that the nurseries of British Columbia are very clean and that our growers are securing home-grown stock that is quite equal, if not superior, to that grown in the United States or in any other part of Canada.

PRUNING-SCHOOLS.

Following the policy of previous years, pruning-schools were again held in the various fruit-growing sections of the Province. These schools have been very popular throughout the Province and are no doubt proving of great benefit to fruit-growers.

The total number of schools held during 1921 was forty, with a total attendance of 441 pupils. (*See* Appendix No. 4.)

PACKING-SCHOOLS.

The demand for packing-schools has come largely from the smaller centres. While the number has not been as large as in the case of pruning-schools, they have nevertheless proven their value as a training-ground for packers who intend to take up this phase of horticulture either in a commercial way or to pack the fruit grown on their own place. It is hoped that a continuance of this work will be possible during the coming year. This year a total of eight schools were held, with a total attendance of ninety-nine. (*See* Appendix No. 5.)

AGRICULTURAL EXHIBITIONS.

At the various agricultural exhibitions which are held throughout the Province during the year your Horticultural staff are asked in practically all cases to act as judges of the horticultural exhibits. This entails a large amount of work, particularly during the months of September and October, when most of the fall fairs are being held. The value of the work, however, lies in the fact that all judges engaged in this work have a common standard which makes for a uniformity of judging throughout the Province; and as that standard is high it is hoped that there will be a marked improvement in the quality of horticultural exhibits at the various fairs.

Furthermore, your staff has at all times been ready and willing to assist any Fair Associations in drawing up their prize-lists in such a way as to secure the best results not only from a commercial but also from an educational standpoint.

DEPARTMENTAL EXHIBITS.

Horticultural exhibits had previous to this year been made at several of the large exhibitions. This year an educational exhibit along horticultural lines was made at several of the fairs in the Okanagan Valley. The exhibit, I may say, was most successful not only in creating an interest amongst the growers, but also in permitting them to discuss matters along the lines of horticulture with the members of your staff who were in charge.

ORCHARD-SURVEY.

The orchard-survey which had been started in 1920 in the Kootenays was completed this year. The complete survey of this district, together with the orchard-survey of the Okanagan and Boundary country, which were completed in 1920, gives accurate data regarding the area devoted to the growing of tree-fruits in the principal tree-fruit districts of the Province.

PUBLICATIONS.

During the past year a circular on Blackberry Culture, No. 57, has been prepared by F. L. Goodman, District Horticulturist for the Lower Mainland. Another circular entitled "Strawberry Culture," No. 58, has been prepared by E. W. White, District Horticulturist for the Islands District, and is at present in the printer's hands. Both of these circulars will fill a long-felt want and will make a valuable addition to the list of circulars already issued by your Branch.

As in the previous year, the Weekly News Letter and the Horticultural District Bulletin were again published. Both of these were issued weekly from the Vernon office, the correspondents in the various sections of the Province contributing to their columns. The popularity of the Weekly News Letter is shown in the increased mailing-list, as well as in the frequency in which it is quoted in the daily and weekly Provincial papers. The Horticultural District Bulletin, while distributed only amongst your own staff, has served the purpose of keeping the members in touch with the various lines of horticultural work that each is carrying on in his individual district.

APPRECIATION.

In conclusion, may I take this opportunity of expressing my appreciation of the excellent co-operation and assistance which has been received by your Horticulturist from the staff situated in various parts of the Province. Thanks are also due to the members of the various Dominion branches, as well as to the members of the Horticultural staff of the University of British Columbia, for their assistance in short courses and other lines of work undertaken.

All of which is respectfully submitted.

W. H. ROBERTSON,
Provincial Horticulturist and Inspector of Fruit Pests.

REPORT OF DISTRICT HORTICULTURIST AND INSPECTOR OF FRUIT PESTS, VANCOUVER ISLAND AND GULF ISLANDS.

E. W. WHITE, B.S.A.

W. H. Robertson, Esq.,
Provincial Horticulturist and Inspector of Fruit Pests,
Department of Agriculture, Victoria, B.C.

SIR,—I beg to submit herewith my annual report as District Horticulturist and Inspector of Fruit Pests for Vancouver Island and the Gulf Islands for the year 1921.

STAFF.

The announcement of your appointment as Provincial Horticulturist and Inspector of Fruit Pests on April 1st, 1921, was received with a great deal of satisfaction by the writer, and I beg to report to you for the entire year of 1921.

The work on Vancouver Island and the Gulf Islands has been carried on entirely by your District Horticulturist, with the exception of the services of K. W. Munson, of Chilliwack, for three weeks in February on pruning-school work.

HORTICULTURAL CONDITIONS.

The year of 1921 was one in which the fruit-growers experienced a great many difficulties and set-backs due to climatic and marketing conditions.

The early and excessive rainfall during the fall of 1920 made it practically impossible for the strawberry-growers to keep up late cultivation and thus control the growth of weeds. Growth was almost continuous during the winter months, no excessive frosts being experienced. Fortunately enough, fine weather came early in the spring to make the cleaning-up of the patches possible before growth got well started.

Severe frosts during the blooming period of tree-fruits resulted in practically a failure of the pear-crop. Cherries, plums, and prunes were also seriously affected, with the exception of Olivet cherries, which were a fair crop. Apples gave promise of a fair to good crop early in the season. Unfortunately the wet weather experienced during June and July caused a serious late infection of apple-scab; this was coupled with a severe infestation of green aphis, causing a marked decline in the grade and quality of apples. The net result of these conditions was the marketing of the majority of the apple-crop in slatted crates, very few attempts being made to pack out a No. 1 grade.

The wet weather of June and July also seriously affected the harvesting of the strawberry-crop, which, although no final figures are yet available, was undoubtedly the largest on record.

Early in the season loganberry-growers had prospects of a bumper crop and were dubious about the possibility of selling the fruit at all. However, the drought of August materially reduced the tonnage and the crop moved out fairly satisfactorily.

It was evident early in the season that the general depression in business and financial conditions was going to result in a decided slump in small-fruit prices for the season of 1921.

The canneries and jam-factories, who suffered a severe loss following the decline in the price of their products, after they had paid a price of 20 cents a pound for jam-berries in 1920, were not in the market to buy fruit, except in limited quantities at a low price and on long terms.

The British Columbia Berry-growers' Association became an active marketing organization early in the year and its influence was felt on Vancouver Island, due to the fact that the Gordon Head Fruit-growers' Association became an active member.

The Saanich Fruit-growers' Association, although invited, did not see their way clear to join the British Columbia Berry-growers' Association and shipped their car-load lots to the Prairies through a private brokerage firm.

In former years the Gordon Head Fruit-growers' Association and the Saanich Fruit-growers' Association had shipped jointly in car-load shipments to the Prairies. In 1921 the two organizations shipped entirely independently as far as the strawberry-crop was concerned; the former association shipping twenty-six car-loads and the latter twenty-four car-loads, a total of fifty car-loads of strawberries.

All this fruit was shipped to the Prairie market on consignment and the prices received were not satisfactory to the shipping organizations.

It is expected that with the arrival of more normal conditions in business circles, prices for small fruits will be more satisfactory in 1922.

Greenhouse and market-garden vegetable-crops were on the whole good.

During November there were excessive rains, causing serious flood conditions. In December there was a very severe and continued frost spell.

HORTICULTURAL DEVELOPMENT.

There has been considerable extension in the planting of small fruits in several districts. In the Gordon Head and Keating Districts plantings have been well maintained, while in the North Saanich District advancement has been made and growers in that district are looking toward the formation of a marketing organization for 1922.

In the Metchosin and Sooke Districts the planting of small fruits has been extended.

In the Cowichan District, from Cobble Hill to Chemainus, the plantings have increased to such an extent that it was found necessary to organize the Cowichan Co-operative Fruit-growers' Association early in the spring of 1921. This association handled the marketing of practically

the total crop in the Cowichan District, and although the association was a member of the British Columbia Berry-growers' Association, arrangements were made to market the entire crop on Vancouver Island, principally at centres north of Duncan. This association is well prepared to handle the increase in production which will take place in 1922.

In the Ladysmith and Nanaimo Districts there has also been development and also at Parksville and Errington.

The Errington Co-operative Produce Association again operated their small jam plant at that place.

In the Comox Valley small-fruit growing is decidedly on the increase. The soldier settlers at Merville planted out approximately 60,000 strawberries and 15,000 raspberries in the spring of 1921. Individuals in other parts of the valley have also made plantings. Development has reached such a stage in this district that late in the year a public meeting was called for the purpose of discussing the necessity for organizing as the Comox Valley Fruit-growers' Association. The Comox Creamery has made the offer to act as buying and selling agents for such an association.

On Saltspring Island there has also been advancement. The Saltspring Island Co-operative jam-factory was established early in the year. A lot was purchased at Ganges, a building was erected, and equipment installed. A very successful operating season was experienced and a market outlet was given to small-fruit growers on the island.

In the vicinity of Victoria there has been a considerable increase in greenhouse-construction. Some firms have increased their capacity and new firms have come into existence.

Demonstration Strawberry-plot, Gordon Head.

This 6-acre plot, which was established in March, 1919, and reported on in 1919 and 1920, was again operated during 1921. This work required a great deal of attention during the year by your District Horticulturist.

The opportunity is taken at this time to express appreciation of the conscientious and earnest way in which G. A. Vantreight, on whose farm the plot is situated, co-operated in the work of the plot.

A brief description will here be given of the operations carried on on the various lots during 1921.

Lot 1.—This lot was in clover in 1919 and potatoes in 1920. Following out the rotation adopted, this was the acre to be planted to strawberries in 1921. On March 10th, 1921, the lot was harrowed once, just to break up the surface soil and conserve the moisture.

On March 22nd and 23rd the new weevil-barrier was erected. Owing to the fact that a weevil-barrier was erected around Lot 2 in 1920, it was only necessary to erect the new barrier on the north and south ends and the west side, the barrier on the west side of Lot 2 serving for the barrier on the east side of Lot 1.

The barrier erected on Lot 1 varied considerably from that erected on Lot 4 in 1919 and Lot 2 in 1920, because it was in fact an oil barrier, whereas the two previous barriers were tanglefoot barriers.

The lumber for the west side consisted of 2- by 10-inch planks, 16 feet long, with a V-shaped groove on the top edge to hold the oil. The planks were erected on edge and fastened every 16 feet to 2- by 6-inch by 2-foot posts. Each plank was set on the level by the use of a spirit-level, and to take care of the natural fall in the ground it was necessary to "step" each plank a little lower than the previous one.

The north and south ends were constructed of 1- by 12-inch lumber approximately 16 feet long, which had been used in the construction of the barrier on Lot 4 in 1919, and which barrier had been taken up in February, 1921, as being considered of no further value in protecting Lot 4.

To this barrier, on the north and south ends, was nailed on the outside a 2- by 4-inch V-shaped grooved strip to hold the oil. The same material was also used on the barrier on the west side of Lot 2, which formed an oil barrier on the east side of Lot 1. Thus there was a complete oil barrier around Lot 1. The total cost of materials for this barrier and labour in erecting the same was $114.59.

On March 30th Lot 1 was double-disked, double-harrowed, and floated in preparation for planting. On April 7th planting commenced and seventeen rows were planted in four hours by two men. On April 8th twenty-four rows were planted in 5½ hours by two men. On April

9th the remaining three rows were planted in three-quarters of an hour by two men, making a total of forty-four rows or approximately 11,000 plants set in 10¼ hours by two men. Nothing but Magoon plants were used which were grown on the farm of G. A. Vantreight, but not on the demonstration plot. The work on this lot for the remainder of the season consisted of hoeing, cultivating, cutting blossoms, and cutting runners. The plants made very good growth during the season.

Lot 2.—This lot was in potatoes in 1919 and was the lot used to plant strawberries in 1920, so that in 1921 it was producing its first crop of berries.

In reporting on this lot in 1920, omission was made to mention the fact that owing to the severe freeze of December, 1919, and the subsequent scarcity of plants in the spring of 1920, it was necessary to use part Magoons and part Paxtons. Accordingly, the first twelve rows on the west side were set to Magoons, consisting of 2,730 plants; the next eleven rows were set to Paxtons, consisting of 2,775 plants; and the last twenty-one rows were set to Magoons, consisting of 5,250 plants; a total of 10,755 plants. It may be mentioned that the majority of the plants used in the last twenty-one rows were a poor second grade and some were a poor third grade.

An excellent photograph of the eleven rows of Paxtons on Lot 2 in full bloom in 1921 may be seen in Fig. 5, page 13, of Circular No. 58 (New Horticultural Series), entitled "Strawberry Culture," published by the Department of Agriculture, Victoria, B.C.

The most valuable information to report on this lot in 1921 is of course the crop. The following table will show the dates of picking and the quantities of both Magoons and Paxtons harvested:—

Date.	Magoons (33 Rows).			Paxtons (11 Rows).		
	Crates.	Hallocks.	Lb. Jam-berries.	Crates.	Hallocks.	Lb. Jam-berries.
June 10	...	22	...	...	..	...
„ 17	37	..	...	3	..	...
„ 21	26	..	...	...	..	...
„ 22	35	..	...	18	..	...
„ 25	59	20	...	...	..	...
„ 27	...	..	...	36	14	...
July 1	42	12	...	...	..	...
„ 2	51	..	...	...	..	600
„ 7	25	..	40	39	..	...
„ 8	...	..	200	...	..	350
„ 12	6	..	30	13	..	75
„ 14	...	..	...	...	..	35
„ 18	...	..	...	...	..	75
Totals	281	54	270	109	14	1,135

Recapitulation—

Magoons	283 crates	6 hallocks	270 lb. jam-berries.
Paxtons	109 „	14 „	1,135 „ „
Totals	392 „	20 „	1,405 „ „

At the approximate average prices prevailing in 1921 this yield would give the following return per acre:—

393 crates @ $1.50	$589 50
1,405 lb. jam-berries @ 8 cents	112 40
Total	$701 90

It should be noted that there was a severe infestation of June-bug in the north-east corner of this lot in 1921, which reduced the number of Magoon plants by approximately 1,500 and materially reduced the yield, especially on the last twenty-one rows of Magoons. The approximate average yield per plant on the Paxtons was 1.04 lb. and on the Magoons 0.74 lb.

Of course, it is well known to all strawberry-growers that returns received in 1921 were disastrous; this year being, perhaps, one of the most unsatisfactory on record, as far as marketing conditions and prices received were concerned.

Following up the policy adopted in 1920, 100 Leghorn cockerels about 8 weeks old were purchased at 30 cents, or a total of $30, and placed on the lot on July 13th. From observations made in 1920 it was thought that these cockerels did a great amount of good in picking up migrating adult weevils.

The feed purchased and consumed during the season of 1921 was as follows: 1 sack wheat, $3.30; 1 sack cracked corn, $2.70; 1 sack poultry-mash, $2; 1 sack scratch-food, $2.70; and 2 sacks scratch-food, $5; a total cost of $15.70.

On September 6th the first lot of cockerels were sold at public auction in Victoria, 36 bringing 45 cents each, a total of $16.20, less $1.60 commission, or $14.60 net. On September 27th 16 cockerels sold for 55 cents and 19 sold for 50 cents, a total of $18.30, less $1.85 commission, or $16.45 net. On September 30th 15 cockerels sold at 30 cents and 10 at 40 cents, a total of $8.50, less 85 cents commission, or $7.65 net.

The total outlay for cockerels and feed was $45.70 and the net receipts from the sale of 96 was $38.70, a deficit of $7, no allowance being made for the time necessary to feed and water the birds for the 80 days they were on the plot. There were only 4 cockerels lost during the season out of the 100 purchased.

Lot 3.—This lot was in fall wheat in 1919 and oats and vetch in 1920. In 1921 this was the regular potato lot. Early in the spring decision was made to grow this acre of potatoes under the certified-seed plan of the Soil and Crop Division of the Department of Agriculture.

As reported in 1920, the hill-selected seed from Lot 1 that year amounted to 4,760 lb. Of this amount, 790 lb. was the selected seed from six rows which were planted in the spring of 1920 with so-called diseased seed; that is, seed which showed a brown discoloration when the stem-end was cut. This 790 lb. of seed was not used on the demonstration plot in 1921, but was planted on another part of the farm, and it may be reported here that the resulting crop was poorer and had more disease than any other potato-patch on the farm. This emphasizes the fact very clearly that it is absolutely essential to cut the stem-end of all seed-potatoes and discard any showing a brown discoloration.

Deducting 790 lb. from 4,760 lb. leaves a balance of 3,950 lb. which was available for selecting seed for Lot 3 in 1921.

It was decided to dip all the selected seed in a solution of corrosive sublimate, and for this purpose a dipping-tank was specially constructed. While the dipping operation was in progress a special selection of seed was made for Lot 3 and a total of approximately 1,800 lb. was secured. Actually 1,788 lb. of seed was used for planting Lot 3. In cutting this amount of seed there was a waste of 168 lb., leaving the net weight of potatoes planted in the forty-nine rows as 1,620 lb.

This may seem like a large quantity of seed to plant per acre, but it is well to point out that this was all cut seed from 6- to 12-oz. potatoes. The Sir Walter Raleigh potato is also one in which the eyes are not numerous, and to secure two good eyes to each set it is often necessary to have the set weighing considerably over 2 oz.

In the preparation of Lot 3 for planting it may be said that the lot was harrowed on March 10th, disked twice on April 4th, and the potatoes were ploughed in on May 19th with one horse in eight hours. Three men worked the same length of time dropping the sets. Cultivation and hoeing was kept up during the balance of the season.

During 1920 it was evident that there was a slight percentage of another variety than Sir Walter Raleigh mixed in with the Raleigh seed. This potato is very similar in the tuber, but very different in the type of top growth, especially early in the season. The variety is, however, an excellent yielder and strong grower. It was decided, therefore, to carefully mark every plant of this variety by staking. This was done on July 19th and 274 plants were marked.

Digging commenced on September 26th. On that date and on September 28th and 29th all the diseased and weak hills were dug up. A total of 2,289 hills were dug, which yielded 740 lb. of commercial potatoes and 305 lb. of culls. These potatoes were immediately sold off the farm.

On October 20th the unknown variety was dug up, and 190 hills yielded 433 lb. of selected seed and a balance of 151 lb. The difference between 274 hills, the number originally marked, and 190, the number finally dug, was due to the fact that eighty-four hills were dug up as either diseased or weak hills.

On November 3rd, 4th, 5th, 7th, and 8th the main crop of Sir Walter Raleighs was dug. Thirty-eight rows yielded 8,994 lb. which were eligible for bin inspection as certified seed and 700 lb. of culls. Eleven rows were especially hill-selected for seed to be used on Lot 5 in 1922 and yielded 1,683 lb. of hill-selected seed, 600 lb. of commercial potatoes which were sold for table purposes, and 144 lb. of culls. The total yield for Lot 3 was 13,750 lb., or just 250 lb. less than 7 tons per acre. This yield was considered satisfactory as 1921 was a poor potato-year and not nearly as favourable as 1920.

Lot 4.—This lot was planted to strawberries in 1919 and yielded its first crop in 1920. The yield was satisfactory in that year and peak prices were received.

Towards the fall of 1920 it was evident that the plants were not as thrifty as they should be and a considerable number of weevil were present. It was a well-known fact that over-wintering adult weevils had gained entrance to this lot soon after the plants were set in 1919 and before the weevil-barrier was erected. In 1920 and 1921 great care was taken to have the barriers completely erected before planting took place. It was always questionable as to whether Lot 4 would survive to produce a second crop.

On February 23rd and 24th the weevil-barrier was taken up because it was apparent that, even though the plants produced a second crop, the barrier was of little benefit, and it had been decided to use a portion of the lumber in the erection of the barrier on Lot 1.

On March 29th the 13½ rows of Marshalls, which had never been satisfactory, were dug out and burned. Even then it was decided to leave in the remaining 30½ rows of Magoons. However, by May 1st it was apparent from the severity of the weevil-infestation that it would be advisable to remove the Magoons. This was done on May 3rd and they were piled and burnt on May 9th. The taking-up of these plants broke up the rotation on this lot and it was decided to put the lot into potatoes.

It was thought that perhaps an earlier potato than Sir Walter Raleigh might be found suitable to Gordon Head conditions, and for this reason 100 lb. of Gold Coin seed was secured from P. W. Anketell-Jones, Chemainus, B.C. This seed was planted on May 3rd on Lot 4 and occupied the first three rows.

After preparation of the land the balance of the lot was planted to Sir Walter Raleighs on May 23rd. A total of 1,757 lb. of seed was used. The waste in cutting was 172 lb., leaving the net weight of seed used as 1,585 lb. for the forty-six rows. This seed was all dipped in corrosive sublimate and was the balance of the selected seed from Lot 1 in 1920. This lot was fertilized with 600 lb. of Imperial fertilizer applied in the furrow.

The same procedure was adopted with this lot as was done with Lot 3. On July 19th all the plants of the unknown variety were staked, there being a total of 404. On September 29th and 30th and October 1st the diseased and small hills were dug up. A total of 3,541 hills yielded 680 lb. of commercial potatoes and 495 lb. of culls. These were immediately sold. On October 18th the three rows of Gold Coins were dug and yielded 263 lb. of selected seed and the balance amounted to 414 lb. On October 20th the unknown variety was dug and 265 hills yielded 405 lb. of selected seed and a balance of 248 lb. There were 404 hills originally marked and 265 dug; the difference, 139, were dug as diseased or small hills. On November 1st, 2nd, and 3rd the main crop of Sir Walter Raleighs was dug. The forty-six rows yielded 7,786 lb. which were eligible for bin inspection as certified seed and 920 lb. of culls. The total yield was 11,199 lb.

Both Lot 3 and Lot 4 passed the two field inspections for certified seed, and it is hoped that in the spring of 1922 there will be a certain amount of Sir Walter Raleighs available as certified seed from the demonstration plot.

Lot 5.—This lot was in fall oats in 1919. In 1920 spring oats were planted and it was seeded to clover. In 1921 there was a good stand of clover which was cut on July 8th and yielded approximately 3¾ tons, valued at $20 per ton. This lot was manured during the fall months with eight 5-yard loads of horse-manure in preparation for a crop of potatoes in 1922.

Lot 6.—This lot was also in fall oats in 1919. On March 27th, 1920, it was seeded to English Wonder peas for seed. The peas were in full bloom on June 7th, but the lamb's-quarter threatened to ruin the crop. For this reason the peas were ploughed down on June 10th and potatoes planted. After the potatoes were harvested the land was prepared and seeded to fall wheat and hairy vetch. On March 7th, 1921, this lot was seeded with 22 lb. of clover-seed. On July 16th the fall wheat was cut for hay and yielded approximately 2 tons, valued at $20 per ton. This lot will be the clover lot for 1922.

PRUNING-SCHOOLS.

As a result of the notices which were sent out in the fall of 1920 offering five-day pruning-schools, a number of applications were received. Eight schools were held at various points on Vancouver Island and the Gulf Islands. Your District Horticulturist personally conducted five of these schools, and the services of K. W. Munson, of Chilliwack, B.C., were secured to conduct the other three schools.

The following table will show briefly the details of these various schools:—

Place held.	Instructor.	Dates.	Pupils.
Qualicum Beach	K. W. Munson	January 31 to February 4	17
Denman Island	,,	February 7 to 11	14
Gordon Head	E. W. White	,, 7 to 11	19
Duncan	,,	,, 14 to 18	10
Ladysmith	K. W. Munson	,, 14 to 18	11
Saltspring Island	E. W. White	,, 21 to 25	8
Nanaimo	,,	,, 28 to March 4	8
Pender Island	,,	March 7 to 11	9
Total			96

A date was set for a pruning-school at Sahtlam, under the auspices of the United Farmers of British Columbia Local, from March 14th to 18th, but the school was cancelled by the Secretary owing to the lateness of the season. However, three days were spent in the district giving individual instruction to intending pupils.

Applications were also received from the United Farmers of British Columbia Local at South Gabriola Island; the Bayview Local of United Farmers of British Columbia, Ladysmith; and the Whaletown Farmers' Institute. It was impossible to set dates for these three applications owing to the lateness of the season at which they were received.

From August 1st to 5th a visit was paid to Cortes Island, the district covered by the Whaletown Farmers' Institute. This visit was made partly in lieu of the fact that it had been impossible to conduct a pruning-school in the spring.

It may be said that these pruning-schools were much appreciated by the pupils, and it is thought that the information given out will help considerably to place the practice of pruning on a more uniform basis.

ORIENTAL SURVEY.

During the months of April and May it was necessary to spend a good deal of time in making a survey of all lands owned or leased by Orientals on Vancouver Island from Nanaimo south. A complete tabulated report on this matter has already been submitted to you.

STRAWBERRY-PACKING DEMONSTRATIONS.

At your request a number of strawberry-packing demonstrations were arranged through the various Fruit-growers' Associations at the start of the strawberry season. The object of these demonstrations was to give growers and pickers a clearer explanation of the "Fruit Marks Act" and to instruct them regarding the requirements of a No. 1 shipping-berry, berries fit for the local market, and jam-berries.

The Gordon Head Fruit-growers' Association decided not to set definite dates or time for demonstrations in the Gordon Head District. However, on the afternoon of June 16th, in company with T. H. Bain, Dominion Fruit Inspector, and B. T. Boies, Inspector for the Gordon Head Fruit-growers' Association, instruction was given to growers and pickers on six individual farms at Gordon Head.

On June 15th and 17th, in company with T. H. Bain and Wm. Buchanan, Assistant Dominion Fruit Inspector, visits were paid to twelve farms in the Keating District and individual instruction given to growers and pickers.

On June 22nd and 23rd six demonstrations were given in the Keating District at places and at times set by the Saanich Fruit-growers' Association. The total attendance at these six meetings was sixty-five. T. H. Bain and Wm. Buchanan attended all meetings.

The Cowichan Co-operative Fruit-growers' Association arranged for three demonstrations on June 20th, which owing to the wet weather were not largely attended, but were greatly appreciated by those who did attend.

This work was appreciated in all the districts and growers and pickers gained a clearer idea of what was really required.

EXPERIMENTAL SPRAYING.

Stewart Bros.' Orchard, Keating.—The work as reported in 1919 and 1920 was continued in 1921 on this plot for the control of anthracnose. The spraying in the fall of 1921 completed three years' work, but a complete report on the work is impossible until the counts of infection are made next May. The applications were again varied slightly in 1921.

On August 30th Lots 1, 2, 3, and 4 were sprayed with 1–1½–40 Burgundy mixture. On November 8th Lot 3 was sprayed with 3–4–40 Bordeaux mixture, Lot 4 with 6–6–40 Bordeaux, and Lot 5 with 1–9 lime-sulphur solution.

The results of the counts on infection made on June 1st, 1921, following the 1920 sprayings will be found in the report of the Provincial Plant Pathologist.

HORTICULTURAL COMPETITIONS.

On May 31st your District Horticulturist assisted Professor L. Stevenson, of the Dominion Experimental Station, to judge a strawberry competition held under the auspices of the South Saanich Farmers' Institute. There were twelve entries and the competition was very keen.

On July 11th a loganberry competition, also held under the auspices of the South Saanich Farmers' Institute, was judged by your District Horticulturist. There were eight competitors.

FLOWER-SHOWS AND FALL FAIRS.

The following flower-shows and cottage gardeners' exhibitions were attended in the capacity of judge: Sluggett's, July 6th; Sooke, July 7th; Colwood-Luxton, August 10th; Sidney, August 20th; Ward II., Saanich, August 27th; Garden City, Ward IV., Saanich, August 31st.

The following fall fairs were also attended in the capacity of judge of fruit and vegetables: North Vancouver, September 2nd and 3rd, assisted by Professor A. F. Barss; Langley (Milner), September 7th, assisted by Geo. Boving; Surrey Centre, September 8th; Whonnock, September 9th, assisted by F. B. Cotsworth; Provincial Exhibition, New Westminster, September 12th to 17th (your District Horticulturist assisted with the judging at this fair); Duncan, September 15th to 17th, assisted by H. P. Allberry; Matsqui (Gifford), September 20th and 21st; Mission, September 28th to 30th, assisted by L. A. La Pierre; Ladner, September 30th and October 1st; and North and South Saanich, October 4th and 5th, assisted F. L. Goodman. A detailed report has been submitted on this work.

INSPECTION OF NURSERIES.

This work was carried out according to the regulations in so far as it was possible. Inspections were made in the spring at shipping-time, during the summer, and again in the fall at digging. Owing to the lateness in the season at which the pruning-school work was concluded it was not possible to make an inspection of each individual tree.

The supply of nursery stock is gradually increasing, but the price still remains high for fruit-tree stocks.

INSECT PESTS AND DISEASES.

Systematic orchard-inspection work has not been possible during the past year, due to lack of time. However, a great many inspections have been made, dealing with specific requests for information on insects and diseases.

Owing to the extremely wet weather during June and July late infections of apple-scab were numerous and most orchards were badly attacked. The wet weather also provided conditions favourable for a severe attack of aphis, and these two troubles materially decreased the supply of No. 1 apples.

The strawberry-root weevil was bad in some instances, but generally over the whole district this pest appears to be giving less trouble. It may be somewhat hard to account for this fact, but in the opinion of the writer the work which has been done by the Horticultural Branch and Dominion Entomological Branch is beginning to bear fruit. Strawberry-growers are adopting

better cultural methods for the control of the weevil and some system of permanent crop-rotation is being followed in many cases. In fact, the strawberry-growers to-day are not causing the rapid spread of the weevil as they undoubtedly did a few years ago.

No serious outbreak has occurred during the year, and where the proper control measures have been adopted growers have been successful in combating the various troubles.

Conventions and Meetings.

On January 19th, 20th, and 21st the annual convention of the British Columbia Fruit-growers' Association was attended at Nelson, B.C.

The Western Plant Quarantine Board met at the Parliament Buildings from June 7th to 10th, inclusive. A number of the sessions were attended and assistance was given in showing the delegates around the district.

From July 26th to 29th, inclusive, your District Horticulturist was privileged in being able to attend the fourth annual meeting of North-western Horticulturists, Entomologists, and Plant Pathologists at Hood River, Oregon. On that occasion the writer had the honour of presenting a paper on "Apple-tree Anthracnose or Black-spot Canker Control."

Great benefit was derived from being able to attend all of the above conventions.

During the year a large number of meetings under the auspices of various farmers' organizations were attended and talks given on different horticultural subjects.

Demonstrations and General Work.

Demonstrations in various branches of horticultural work and personal visits to growers occupied a great deal of time during the year; although this type of work is extremely popular, there is very little to show for the same at the end of each year.

Two trips of inspection were made during the past year to the soldier settlement area at Merville and as much assistance as possible given to those interested in the culture of small fruits. A trip was made in August to Mary Island and Cortes Island, and in October a trip was made to Texada Island. It is impossible to visit the outlying portions of the district as often as they deserve.

It might be interesting to note that during the past year, in the performance of his duties, your District Horticulturist has travelled the following distance: By automobile, 9,816 miles; by boat, 1,858 miles; by train, 1,960 miles; making a total of 13,634 miles for the year.

Fruit- and Vegetable-crop Statistics.

During the fall of the year a great deal of time is occupied in collecting fruit- and vegetable-crop production figures for the Statistics Branch. These figures are used in determining the total yearly agricultural production for the Province.

Publications, Correspondence, and Office-work.

Towards the end of the year your District Horticulturist prepared Circular No. 58 (New Horticultural Series), entitled "Strawberry Culture." It is hoped that this circular will fill the demand for information on this subject.

Owing to the position of Provincial Horticulturist being filled by your appointment the writer has been relieved of a great deal of correspondence-work.

A great many visitors have called at the office seeking information and all the assistance possible has been given.

All of which is respectfully submitted.

E. W. White,
District Horticulturist and Inspector of Fruit Pests.

REPORT OF DISTRICT HORTICULTURIST AND INSPECTOR OF FRUIT PESTS, LOWER MAINLAND.

F. L. GOODMAN.

W. H. Robertson, Esq.,
Provincial Horticulturist and Inspector of Fruit Pests,
Department of Agriculture, Victoria, B.C.

SIR,—I beg to submit herewith my annual report as District Horticulturist and Inspector of Fruit Pests for the Lower Mainland District for the year 1921.

HORTICULTURAL CONDITIONS.

From the production standpoint the small-fruit grower of the Lower Mainland has had a very successful year. The winter was mild and there was an absence of winter-injury and frost-heaving. The spring rains, unfortunately, continued into the strawberry season and interfered considerably with the harvesting of the crop. As a result of the excessive moisture the berries were very soft and there was a tendency for them to break down before full colour was attained. Due to this many shipping-berries were picked too green and suffered materially on the market. The growers incurred a vast amount of additional work owing to the necessity of dusting or otherwise cleaning the mud-splashed berries. There was almost a complete omission of the practice of "strawing" by the growers in a season when strawing was particularly necessary.

The raspberry-crop was abundant and the season favoured by good weather. The young growth in most cases is stout and healthy and gives good promise for next year.

Loganberries and blackberries cropped very heavily and well warranted the care given them. Particularly fine was the crop taken on the slightly heavier soil of the Chilliwack Valley.

Tree-fruits in most cases cropped very lightly. Apples did best and in some localities exceeded last year's crop. Pears, due to poor weather conditions at the time of blossoming, were almost a total failure. Plums and prunes also were very poor, largely on account of the heavy infestation of brown-rot. The cherry-crop, generally speaking, was good.

Practically all vegetable-crops were highly satisfactory.

FLOWER-SHOWS AND FALL FAIRS.

On June 25th your assistant attended and judged at the Clayburn Rose and Flower Show, organized by the Matsqui Women's Institute, and on August 3rd at the flower-show of the Fort Langley Women's Institute, held at Fort Langley.

The following fall fairs were attended in the capacity of judge: Port Haney, September 7th and 8th; Agassiz, September 21st; Port Coquitlam, September 22nd; Aldergrove, September 23rd; Courtenay, September 27th and 28th; Ladysmith, September 28th and 29th; Saanichton, October 4th and 5th. The Provincial Exhibition at New Westminster, September 12th to 17th, was also attended and the writer assisted in the judging of fruit and vegetables.

A separate report on fall fairs was submitted at their termination to the Secretary of the Department of Agriculture.

INSPECTION OF NURSERIES.

Your Inspector was present at the different nurseries on the Lower Mainland during the digging of nursery stock for shipment. All stock was carefully examined and any found in a diseased or infected condition was either destroyed or, where practicable, treated. With the exception of crown-gall and woolly aphis in the apple stock and some minor conditions in other plants, the nursery products of the Fraser Valley were found to be well-grown, vigorous, and in excellent condition.

CONVENTIONS AND MEETINGS.

On June 7th to 10th the meetings were attended at Victoria of the Western Plant Quarantine Board. On November 5th the meeting of the Fort Langley Local of the United Farmers of British Columbia was attended and an address given on some phases of small-fruit culture.

FRUIT- AND VEGETABLE-CROP STATISTICS.

A considerable amount of time was taken up during the closing weeks of the year in collecting figures bearing on the year's crop production. This work necessitates the canvassing of many of

the growers, the visiting of co-operative associations, and jam and cannery concerns, as well as much office-work in compiling and tabulating results.

Bella Coola District.

In accordance with instructions, your assistant visited Bella Coola in August and made an extensive survey of the agricultural district. No meetings were held, as it was felt that at that season and in rather scattered communities the farmers had not the time to spare. As many as possible of the farmers were visited, however, and their problems taken up with them at home. Appreciation was expressed that the Department had found it possible to send a representative to the district and in various ways was recognizing the needs of that thriving community.

A report on the visit, the country, and the conditions prevailing was forwarded to the Departmental Secretary on the writer's return.

Codling-moth Control.

The codling-moth situation at North Bend occasioned a number of visits to that neighbourhood during the past season. With the co-operation of H. Gowen, of North Bend, the necessary spraying-work was done and bands renewed and examined. There appears to be a marked advance in the control of the pest, but the situation demands equally strenuous efforts the coming year.

Insect Pests and Diseases.

Due to favourable conditions in the early part of the year the past season has been marked by a particularly bad infestation of many kinds of fungous disease. Apple-scab has been particularly bad, and even in those few orchards where control measures have been carried on the percentage of fruit free from scab-spots has been small. Brown-rot of stone-fruits caused the loss of a large part of the plum and prune crop, and cherries, particularly sour cherries, suffered heavily from this disease. Mildews were the cause of a great deal of trouble and loss in both garden and orchard. Anthracnose is very prevalent in apple-orchards throughout all the Lower Mainland, and to a certain extent pears are affected.

Of insect pests, the currant-fly (*Epochra canadensis*) did a large amount of damage to the gooseberries, and there was some trouble locally with the root-borer (*Bembecia marginata*) and the cane-borer (*Oberea bimaculata*) in raspberries.

The infestation of aphis was small and insect damage, speaking generally, was negligible.

Circulars and Newspaper Articles.

As a means of getting in touch with a large section of the agricultural community and supplying information of general interest, the Department circulars have the greatest value. Your assistant has aided in the preparation of one of these circulars and also contributed articles of topical interest to the press.

General Field-work.

Requests that visits be made by your Horticulturist are received during the greater part of the year in considerable numbers, and the fulfilling of these requests occupies the major part of the official's time. These requests for visits come from almost all sections of the community and have reference to the gardening problems in the best residential sections of the city, as well as to crop-pest problems in the remote parts of the country. As far as possible all these calls are attended to, but when the demand is so great that time will not permit of all requests being complied with preference is given to those bearing on commercial horticultural problems.

Office-work.

Your Horticulturist for the Lower Mainland has now office accommodation in the Courthouse, Vancouver, and at this office deals with inquiries that are presented and attends to correspondence received.

All of which is respectfully submitted.

F. L. Goodman,
District Horticulturist and Inspector of Fruit Pests.

REPORT OF DISTRICT HORTICULTURIST AND INSPECTOR OF FRUIT PESTS, OKANAGAN VALLEY.

W. T. HUNTER, B.S.A.

W. H. Robertson, Esq.,
Provincial Horticulturist and Inspector of Fruit Pests,
Department of Agriculture, Victoria, B.C.

SIR,—I hereby beg to submit my annual report on general fruit- and vegetable-crop conditions in the Okanagan Valley.

The fruit-crop of the Okanagan District for 1921 established a record in point of tonnage over any previous year. While returns are not completed, it is estimated that our total tonnage will run at least 20 per cent. higher than the largest crop previously recorded, which was in 1919. The soft-fruit tonnage was approximately the same, and some improvement in quality was noticeable in the case of sweet cherries; otherwise the general standard was about the same as in 1920. Very little improvement was noted in the quality of the peaches and apricots, and it is very evident that, if the quality of these fruits is to be raised in the future, more attention to the soil and cultural methods will have to be given.

The apple tonnage was much higher than in 1919, but the general quality was not as good as in 1920 owing to the large percentage of small sizes and culls which prevailed. This was due to a lack of sufficient thinning and to many of the orchards being in poor condition. Where consistent heavy thinning has been practised the quality of the fruit produced in such orchards was well above the average. Considerable breaking-down and spotting was noticeable in the latter part of the season on Jonathan, Northern Spy, Wagener, etc., and this condition caused a heavy loss to some orchardists. Upon investigating the causes which might lead to this condition, your officials are of the opinion that it has been caused mainly by the unbalanced condition of the trees in many cases. It is very evident that our cultural methods of the past, under the practice of clean cultivation, whereby the natural fertility and humus content of the soils has been depleted and no effort made to remedy this condition, the lack of available plant-food, coupled with an underdevelopment of the feeding roots of the trees, leads to a serious malnutrition of the fruit at some period of their growth during the hot season. The apple is in that way injured and with many varieties does not recover, and as a result later in the season we find the cells breaking down and becoming brown. On orchards where no deep ploughing is practised, and where the water-supply is conserved by a shade-crop, the roots are very fully developed in abundance, and are for this reason enabled to function to the fullest extent throughout the growing season, very little trouble has arisen.

Marketing conditions were not quite as good in 1921, as the growers might have hoped, and at the present time no returns have been received for many of our varieties. We believe that before long fair returns will be received in nearly all cases.

Vegetables were only an average crop in 1921. About half the acreage of onions was planted as compared with 1920, and as a result good prices were received for this commodity. The acreage of other vegetables and prices received have been about average.

INVESTIGATIONS AND DEMONSTRATION EXPERIMENTS IN CONNECTION WITH ORCHARD-SOIL PROBLEMS.

This work appeared to be of such importance as to be worthy of special attention, and in the spring of 1921 it was placed under the direction of Mr. Robinson at Vernon and Mr. Britton at Kelowna, and these officials devoted a large percentage of their time to this branch of the work. A series of demonstration plots in each district are now being conducted. These plots are purely of a demonstration nature, as it is not the intention of your officials to endeavour to experiment along these lines, but simply to demonstrate to the growers of the different districts the relative value of nitrate fertilizers as compared with fertilizers carrying other plant-foods; the relative value of vetch *v.* alfalfa as a cover-crop; and to demonstrate, both with cover-crops and commercial fertilizers, the proper method of handling these to the best advantage. As this demonstration-work has been elaborated in the report of your officials at Vernon and Kelowna, further reference to the details can be obtained therefrom.

LECTURES AND MEETINGS.

General Horticultural Meetings.—During the year your officials attended various meetings of the Farmers' Institutes, Fruit-growers' Associations, and various other agricultural organiza-

tions, and on request discussed various phases of orcharding at these meetings. Owing to the large number of requests for reliable information on various orchard problems, it was felt that a series of meetings would be of real benefit to the valley, and accordingly, with the co-operation of R. H. Helmer, Superintendent, Dominion Experimental Farm, Summerland, and the University of British Columbia, a series of one- and two-day meetings were arranged throughout the Okanagan District. One-day meetings were held at Keremeos, Oliver, Naramata, Oyama, Westbank, Peachland, Armstrong, and Salmon Arm. Two meetings were held in each case. Four meetings covering two days were held at the following places: Penticton, Summerland, Kelowna, Okanagan Centre, and Vernon. The series of meetings was opened at Keremeos on February 18th and concluded at Armstrong on March 4th. The subjects discussed and the various speakers who discussed these is as follows:—

P. S. Darlington, Wenatchee, Washington, U.S.A., "Orchard Cover-crops"; R. H. Helmer, Superintendent, Dominion Experimental Farm, Summerland, "Maintaining the Soil-fertility of the Okanagan Orchards" and "Irrigation"; J. R. Terry, Chief Poultry Instructor, Department of Agriculture, Victoria, "Poultry-keeping for the Fruit-rancher"; H. H. Evans, Assistant District Horticulturist, Vernon, "Control of Insect Pests and Diseases"; R. G. L. Clarke, Dominion Fruit Inspector, Vancouver, "Packages and Packing"; Professor A. F. Barss, University of British Columbia, "Principles and Science of Pruning" and "Interrelation of Orchard Practices"; M. S. Middleton, Vernon, "The Practices of Pruning"; W. T. Hunter, District Horticulturist, Vernon, "Varieties of Fruit recommended for Planting" and "Elimination from the Orchard of Non-profitable Varieties"; J. A. Grant, Markets Commissioner, "Markets and Marketing."

These meetings were very successful from the standpoint of total attendance, there having been recorded a total of 3,316 people at the meetings, and from the comments which reached your offices the series was much appreciated by the growers. A similar series of meetings is being planned for the coming February and the meetings are being looked forward to by the growers with considerable interest.

Thinning Demonstrations.—During the month of June thinning demonstrations were held at various points in the valley, a total of twenty-seven meetings being held during the course of twelve days. These meetings were held in the orchards and a short talk on the principles and practices of thinning various fruits was given, besides a practical demonstration. A total attendance of 458 growers was reported.

The series was very popular with the growers, and it is hoped the coming year that a series of similar field meetings can be held, at which not only thinning but other problems of orchard-management can be discussed. A separate report on this series of meetings has already been forwarded.

Fire-blight and Codling-moth.—In the latter part of November a series of meetings was held in connection with the fire-blight campaign, at which the subject of the codling-moth menace was also discussed. Your officials were assisted at these meetings by R. H. Helmer and A. L. McLarty, of the Dominion Experimental Farm, Summerland, and a total attendance of 778 growers was recorded. A separate report having been already submitted on this subject, it will suffice at this time to say that the meetings were very enthusiastically received by the growers, and as the fire-blight campaign and the seriousness of the codling-moth situation in the valley was thoroughly discussed, your officials feel that the series was of very great value to the growers. As a result of the thorough discussion of the codling-moth situation, it is hoped that at the forthcoming British Columbia Fruit-growers' Association Convention at Victoria this subject will be very well discussed and definite action promptly taken towards safeguarding our valley from further infestation by this pest.

Control and Inspection Work in Detail.

Codling-moth (Cydia pomonella Linn.).—Separate reports dealing with actual quarantine-work in connection with codling-moth are appended by those of your officials who were directly responsible for the carrying-out of these important duties. A summary of these reports show that, while good progress was made on the older quarantine areas, a new and very serious outbreak has been reported from the Kelowna District, being located on the K.L.O. Benches. At this time it is difficult just to state definitely the extent of this infestation.

As your officials realized the seriousness of the whole situation, it was felt that by a series of special meetings the interest and co-operation of the growers could be more fully aroused, and accordingly such a series was held and the growers of the entire valley are now heartily behind the efforts of your staff to eradicate and control this serious pest.

Fire-blight (Bacillus amylovorus).—During the season of 1921 much damage from this disease was reported from several sections. A large percentage of the damage was in the nature of blight to the blossoms during and immediately following the period of full bloom. Damage to the extent of 95 per cent. of the blossom-spurs on entire blocks of trees was reported in many instances and from numerous districts. As fire-blight it only carried over the winter in hold-over cankers, it was realized that if the disease was to be checked radical treatment of all orchards infested would have to be given during the dormant season this year.

Plans were matured for an active campaign of eradication on the part of the growers, as our quarantine regulations give your staff very little jurisdiction over the growers as far as enforcing the actual work of cutting during the dormant season. An effort was made to arouse the growers of the entire district to a realization of the menace of the disease to the orchards, and it was planned to put on a big eradication clean-up. This campaign took the form of a preliminary series of public meetings in all points, newspaper articles outlining the campaign and soliciting the whole-hearted support of the growers, and an inspection service by your staff. The growers were urged to co-operate in the campaign by cutting the blight as soon as possible and reporting the completion of their work to their district offices. Officials of your staff then visited the growers, requesting inspection, and if, after a careful survey of the orchard, your assistants were satisfied that the work had been well and carefully done an 8 by 10 card was posted on the property stating that inspection had been completed. The text of the inspection-card is here given:—

"*Inspection.*

"This is to certify that this property has been inspected and that, as far as can be ascertained from a careful inspection of the orchard, all fire-blight infections which would prove a menace have been eradicated, and in our opinion the owner, Mr. , has made a conscientious effort to eliminate this disease from his orchard at this time. His action and co-operation are highly commended and appreciated."

A keen neighbourly rivalry has been aroused and at the time of writing the campaign is going forward with splendid success. That the expense and effort has been worth while is best attested to by the support that is being given the campaign by the growers. The public meetings were given at twenty-five centres and were attended by 778 growers. A detailed list of the places in which meetings were held and the attendance in each place is as follows: Oliver, 52; Cawston, 18; Keremeos, 15; Kaleden, 5; Penticton, 52; Poplar Grove, 21; Naramata, 37; Peachland, 35; Summerland, 57; Glenmore, 25; Ellison, 33; Rutland, 21; Mission, 15; Bankhead, 34; K.L.O., 36; Westbank, 27; Okanagan Centre, 6; Winfield, 36; Oyama, 24; Lavington, 6; B.X., 28; South Vernon, 13; Coldstream, 49; Armstrong, 7; Salmon Arm, 99.

Acknowledgment should be given to R. H. Helmer and A. L. McLarty, of the Dominion Experimental Station, Summerland, for their splendid support and co-operation in assisting at the meetings. They accompanied your assistants on their itinerary and spoke at all the meetings, and the efforts of your staff received their support to the fullest extent.

A system of card-indexing the orchards inspected and passed was inaugurated and is being followed up. In this way reference as to the condition of every orchard with respect to this disease may be made at any time, as it is the intention of your staff to follow up the campaign with close inspections of suspected properties at regular periods in the future. A determined effort will be made to protect those growers who have joined the campaign and cut the infections out of their orchards from delinquents who have not done so, under the authority given your staff under the Horticultural Regulations.

Blister-mite (Eriophyes pyri).—This pest caused very serious injury on the apples during 1921, and as a result of experimental work which was conducted by your official at Summerland your staff is now in a better position to advise remedial measures towards the control of this pest. However, the experimental work which was done in this regard has not been carried out as far as it should be, and it is the intention of your staff to elaborate in this direction the coming season in order that the most reliable control measures can be given from now on.

Oyster-shell Scale (Lepidosaphes ulmi Linn.).—This pest was rather serious in the Vernon District the past season, and as the control sprays recommended by your officials have not been as consistently followed by the growers as they could have been, owing to a general misunderstanding as to the proper time at which these sprays should be applied, it is evident that more attention will have to be paid to the control of oyster-shell scale the coming season. Accordingly, a determined effort will be made to advise the growers more widely than heretofore as to the correct time and the correct spray to use.

Other Pests and Diseases.—Woolly aphis, green apple-aphis, peach-worm, apple powdery mildew, and apple-scab were more or less prevalent the past season, but the damage done by each of these pests or diseases was not of such a nature on the whole to warrant their being especially considered at this time. At the same time it is felt by your officials that the information for the control of all these pests and diseases should be disseminated a little more thoroughly and more carefully than has been the case in the past. Too many of the growers do not realize the necessity of applying control sprays in their individual case thoroughly and at the proper time, nor do they in many cases use the correct mixture. It would appear that the Spray Calendar as issued by your office might be brought a little more up to date and at the same time put out in a little more concise and intelligent manner. Complaints have been received that the calendar is not intelligible to many of the growers; therefore it is to be hoped that the revision as arranged by your staff will be acceptable to you and that a new edition will be available next spring.

PRUNING-SCHOOLS.

The organization of classes for instruction in the science and practice of pruning has taken considerable time during the winter months, but as the results have been excellent the effort and expenditure appears worth while. According to detailed reports already on file, in the months of January, February, and March, 1921, eight pruning-schools were held at the following points: Salmon Arm, 5 schools; Rutland, 2 schools; Cawston, 1 school; with a total registered attendance of exactly 100 pupils. During November and December nine schools were held at the following points: Vernon, 3 schools; Kelowna, 4 schools; Penticton, 1 school; Summerland, 1 school; with a total registered attendance of 97. In nearly all cases the classes consisted of ten periods with each class, nine of which were spent in the orchards on the practice of pruning, and one period being given over to an indoor discussion of the principles of pruning, tools, grafting, etc. The reports which have reached this office would indicate that the classes have all been satisfactory to the growers who attended, and it is very evident that this phase of the work of your staff is very valuable and important.

Applications for further classes at other points in the valley are now on hand and these will be conducted during January and February if at all possible.

PACKING-SCHOOLS.

Very few requests were received for packing-schools this past year, and only one school was held at Oyama by H. H. Evans in the month of August. Up until the present time only two requests are on file, both of these being from the Salmon Arm District. As this is to some extent an unorganized district, in the opinion of your staff it would be advisable to hold classes at these points in the winter of 1922.

AGRICULTURAL FAIRS AND EXHIBITIONS.

Your officials acted as judges of fruit and vegetables at various fairs throughout the Province this year, and separate reports have been forwarded covering these duties in the case of each official. Your assistant acted as judge of fruit and vegetables at Windermere, Golden, Nelson, New Denver, Creston, Rock Creek, Peachland, and Penticton. A separate report of these fairs has been forwarded.

DEPARTMENTAL EXHIBIT AT FAIRS AND EXHIBITIONS.

The past season an effort was made to improve the Department of Agriculture exhibit at the fairs and exhibitions held in the valley, and this was taken charge of by B. Robinson, of the Vernon office, and J. E. Britton, of the Kelowna office, in co-operation with Mr. Ruhmann, of the Entomological Branch. A special feature was made this year of soil-work and cover-crops, and judging by the interest which was aroused at every fair it was very evident that this work

was popular. With the experience which was gained this year, there is every reason to believe that from an educational point of view this phase of the exhibit can be successfully elaborated in 1922. Accordingly, arrangements are now being made to make the Department of Agriculture exhibit and information booth a large feature next year at all the valley fairs.

WEEKLY NEWS LETTER.

The publication of the Weekly News Letter was continued the past summer and the service proved very popular with the public. The first edition was out on May 1st and the publication was continued during the growing and harvesting season. The subject-matter dealt with this year was considerably augmented by the publication of news from the entire Province, in addition to news of importance and interest from this district. A large increase in the mailing-list of this year over that of 1920 appears to be evident proof that the publication of this News Letter is of general interest to the public. Many newspapers throughout the Province published the bulletin as issued, and it was by many other editors used as a weekly basis for their comments on market conditions, etc.

HORTICULTURAL DISTRICT BULLETIN.

The District Bulletin of the 1920 season was this year elaborated to take in news from the other horticultural districts as to the activity of the entire Horticultural Branch. The expansion was very popular with all, and the edition enabled the entire Horticultural staff of the Provincial Department of Agriculture to keep in close touch with the work of one another.

OKANAGAN HORTICULTURAL CLUB.

A growing need for closer harmony and co-operation among all workers in horticultural problems in this district has resulted in the formation of the Okanagan Horticultural Club, an organization composed of Federal and Provincial officials of the Departments of Agriculture and ex-officials of both Departments. Regular monthly meetings are held and subjects of vital interest to the orchard business of to-day are discussed. It is felt that this club will bring each and every official, whether Federal or Provincial, into close touch with the work of all, and by reason of a more harmonious understanding among individuals, and as to the work which these individuals are attempting, much valuable assistance and co-operation can and will be given by all the members.

All of which is respectfully submitted.

W. T. HUNTER,
District Horticulturist and Inspector of Fruit Pests.

REPORT OF ASSISTANT DISTRICT HORTICULTURIST, VERNON.

H. H. EVANS.

W. T. Hunter, Esq.,
District Horticulturist, Vernon, B.C.

SIR,—I beg to submit herewith a brief annual report of general horticultural activities for the past season; also detailed report of codling-moth control work.

FALL FAIRS.

Your assistant had much pleasure in sharing the duties of judging at the following fall fairs: New Westminster, Victoria, Kelowna, and Summerland. Separate reports in regard to same have already been submitted.

PRUNING AND PACKING SCHOOLS.

In the month of August arrangements were made for a packing-school at Oyama; T. Booth acting as Instructor.

In November and December your assistant arranged for three pruning-schools in the Vernon District, conducting one personally; M. S. Middleton acting as Instructor for the balance.

PEST-INSPECTION WORK.

Inspection of Fruit and Vegetables.—During the past season no calls were received by us for inspection of foreign fruit shipments from the Vernon District. On potato shipments to this date inspection has been made on seven and a half cars; of these, five and a half passed inspection; two cars being refused certificate on percentage of diseases.

Inspection of Foreign Cars.—This work will be found incorporated in the detailed report on codling-moth control work.

EXPERIMENTAL WORK.

The five-year pruning experiment being carried by the Department in the Vernon District is now entering the third year; all data possible are being kept on record in connection with the above experiment.

Experimental Scab-control.—The work conducted this year constitutes the second year of the three-year period testing out dry lime-sulphur and the weaker dilutions of liquid lime-sulphur. Applications were made by E. R. Clarke, a student in agriculture of the University of British Columbia, temporarily attached to the Department at that period. The check on the fruit was taken by your assistant, R. A. Newman, and two of the men then on temporary employment.

Tables of applications and results are appended. In Tables I. and II. dry lime-sulphur at different strengths was used, with the addition of hydrated lime to ascertain, if possible, whether the addition of the lime has any bearing on the efficiency of dry lime-sulphur at different strengths. In Plot No. 3 D.L.S. was used at a strength to conform to liquid lime-sulphur concentrate testing 32.5 Beaume.

Definite comparisons and deductions will not be arrived at until the completion of the test period, when averages can be determined.

Definition of Abbreviations.—L.S.—Liquid lime-sulphur. D.L.S.—Dry lime-sulphur. Hd.L.—Hydrated lime.

Locality Scab Experiment, Vernon District.

Table I.—Material Test.

Spray Period.	Plot 1.	Plot 2.	Plot 3.	Plot 4.	Plot 5.	Plot 6.	Plot 7.
Pink	D.L.S. 2-40 and Hd. L. 5 lb.	.....	D.L.S. 4¼ lb.-40	.....	.....	L.S. 1-60	Check.
Calyx	D.L.S. 2-40 and Hd. L. 5 lb.	D.L.S. 1½ lb.-40 and Hd. L. 2½ lb.	D.L.S. 3 lb.-40	D.L.S. 2 lb.-40	L.S. 1-50	L.S. 1-60	"
10 and 14 days later...	.....	.....	.....	....	.....	.....	"
10 and 14 days later...	D.L.S. 2-40 and Hd. L. 5 lb.	D.L.S. 1½ lb.-40 and Hd. L. 5 lb.	D.L.S.3-40	D.L.S. 2-40	L.S. 1-50	L.S. 1-60	"

Table II.—Results of Materials Test.

Plot.	No. of Apples counted.	Fruit free from Scab.	Scabbed but Marketable.	Culls on Account of Scab.	Total Marketable.
		Per Cent.	Per Cent.	Per Cent.	Per Cent.
1	3,441	99.92	0.08	....	100.00
2	3,600	99.018	0.055	0.027	99.073
3	5,930	99.80	0.20	....	100.00
4	4,270	99.837	0.14	0.023	99.97
5	3,772	100.00	....	....	100.00
6	4,930	99.98	0.02	....	100.00
7	4,595	98.31	1.54	0.15	99.85

FIELD-WORK.

Fire-blight.—This disease was very prevalent throughout the district during the season of 1921, and many calls were received from growers for information peculiar to their individual cases regarding the handling of this disease.

Oyster-shell Scale.—This is now very widespread, there being few orchards that have not more or less of the pest to contend with. The pest is causing considerable concern to many growers. Good work could be done by the Department in experimental spraying to determine efficient and economical methods of eradication and control.

Aphides.—The green aphis during 1921 was not serious, but the same cannot be said of the woolly aphis, which during the past season proved itself a serious orchard pest in this district. The heavy infestation was undoubtedly partly due to the mild winter experienced in 1920–21, allowing a larger percentage than usual of the over-wintering adults above ground to remain alive.

CONVENTIONS AND MEETINGS.

During the past year your assistant attended the following: The British Columbia Fruit-growers' Association Convention at Nelson, January 18th and 20th; the horticultural lectures, February 17th to March 5th; the fire-blight and codling-moth campaign meetings, November 23rd to 30th. In addition to the above, your assistant spoke on various problems at five institute and growers' meetings at Vernon, Winfield, and Kelowna.

GENERAL.

Most of your assistant's time has been devoted to the special work of codling-moth control during the past year. The ever-increasing demands by the growers for advice and information respecting the various problems of orchard activities necessitated many visits being made to the various parts of the district. Also during the past season prospective settlers have made considerable use of our time by way of personal visits for surveys and valuations and for reports on prospective purchases. Correspondence and clerical work in general is increasing enormously, proving without doubt the desire of our growers to be up to the minute and their appreciation of the services rendered by the Department of Agriculture.

All of which is respectfully submitted.

H. H. EVANS,
Assistant District Horticulturist.

REPORT ON CODLING-MOTH CONTROL WORK, VERNON, KELOWNA, WESTBANK, WALHACHIN, KAMLOOPS, REVELSTOKE, AND KEREMEOS.

H. H. EVANS.

W. T. Hunter, Esq.,
District Horticulturist, Vernon, B.C.

SIR,—I beg herewith to submit a detailed report of operations, results, and costs of codling-moth control for 1921 in the districts enumerated above. The attached tables are self-explanatory, but a few remarks in reference to the same may not be out of place.

Vernon Town and Westbank areas can now be considered free of the pest. At Okanagan Landing there has been found the past season a wider dissemination of the pest, it having spread into the previously uninfested protective zone. This can be attributed to one of two causes, either from foreign cars or the drift of moths by the prevailing high winds. Also a distinct case of reinfestation was established in a small lot of twelve trees alongside the Canadian Pacific Railway freight-yards, from which were taken 224 larvæ, and undoubtedly due to foreign fruit-cars at this point.

Branding cattle at Beaumont's, Chilcotin, B.C.

Calves at Riske Creek Range, Chilcotin, B.C.

The Chilcotin River Valley.

Oat crop in the Bulkley Valley. The 1921 average for Central British Columbia was 51 bushels per acre.

At Swan Lake the degree of infestation, though light, is dangerous; one specimen was captured in a band, in the protective zone, half a mile distant from the actual quarantine area, which will necessitate enlarged operations the coming season. It is regrettable to note the tremendous increase in material captured, totalling 464, or an increase of 363 per cent. over the season of 1920 for the Vernon District.

The Kelowna Town area, comprising approximately 100 acres, shows in our first year's operations fairly heavy infestation in some portions of the area. It is with regret we announce what may prove to be a serious outbreak on the benches at East Kelowna, situated 6 miles from town and in the midst of a large commercial section aggregating 1,800 to 2,000 acres. Owing to the late date when this infestation was discovered little work could be accomplished. In checking over windfalls in the orchards we definitely established the fact of infestation on 140 acres; we also have strong suspicions that the area infested will prove much larger when our operations are in progress this coming season.

At Kamloops, in August, an infestation was discovered in the city lots by C. G. Smith, who had been detailed for car-inspection work at that point, he being instructed to utilize any spare time in an inspection survey of these lots, and the British Columbia Fruitlands orchards on the north side of the Thompson River, adjacent to Canadian National Railway trackage; no sign of the pest was found on the last-named property. Similar work to the above was carried out by V. T. Allan in the city lots at Revelstoke, no indication of the pest being found.

In the month of November an outbreak was traced to the Summerland Experimental Station orchards. Superintendent R. H. Helmer feels certain this outbreak originated from freight-cars side-tracked on the Kettle Valley Railway close to the Experimental Station. Mr. Helmer states that he will employ drastic measures during the coming season to eradicate the pest from the Experimental Station orchards.

INSPECTION OF FOREIGN REFRIGERATOR-CARS.

The total number of foreign refrigerator-cars cleaned and inspected in 1921 was greatly in excess of the previous year, totalling 409. Complete records of these cars and condition has been kept, total captures made being 282.

During the past four years a certain number of Canadian Pacific Railway cars have been inspected each season by your assistant, anticipating that eventually infestation would be found. The fact was established this season when C.P.R. Reefer No. 284254 was found to contain thirty-seven old cocoons, but no live material.

SPRAYING.

Dates of Application.—First, May 27th to June 6th; second, June 27th to July 7th; third, August 1st to 13th.

The dates given above are for the Vernon and Okanagan Landing areas. Applications for Kelowna, Westbank, and Walhachin were made a few days earlier.

At Walhachin and Kelowna three applications were made; at Westbank, calyx and first cover spray only.

Number of Trees sprayed.—Vernon, 14,100; Kelowna, 6,072; Westbank and Walhachin, 13,315.

Number of Trees banded and inspected.—Vernon, 17,300; Kelowna, 3,555; Westbank and Walhachin, 14,210.

Number of Boxes of Fruit inspected before Shipment.—Vernon, 14,476; Kelowna, 13,205; Westbank, 4,220.

Total Number of Material captured in all Areas.—Larvæ, 799; pupæ, 108; total, 907.

FOREIGN-CAR INSPECTION.

Total number of cars inspected, 409; total number of material captured, 282 (larvæ, 262; pupæ, 20). Keremeos car records are not included in the above.

INSPECTION OF BANDS—DATES AND MATERIAL CAPTURED.

Vernon District.

Orchard-owner.	(1.) July 6 to July 23.	(2.) July 22 to Aug. 20.	(3.) Aug. 18 to Aug. 30.	(4.) Sept. 1 to Sept. 17.	(5.) Sept. 30 to Oct. 30.	(6.) Oct. 31 to Nov. 18.	Larvæ.	Pupæ.
Mickleborough, G.	....	....	....	....	L. 4	L. 8	12	..
"	....	P. 4	....	....	....	....	..	4
Forester, N.	....	L. 7	....	....	L. 4	L. 1	12	..
"	....	P. 8	....	....	P. 1	P. 4	..	13
Wylie, J.	....	....	....	....	....	L. 1	1	..
"	....	....	....	....	....	P. 2	..	2
Standing, W.	....	L. 1	....	....	....	....	1	..
Smart, H. B.	....	L. 12	....	....	....	L. 9	21	..
"	....	P. 10	P. 8	....	....	P. 3	..	21
Weeks, J.	....	L. 1	L. 1	....	....	....	2	..
"	....	....	P. 2	....	....	....	..	2
McDonald, Mr.	....	L. 1	L. 1	....	....	....	2	..
Van Antwerp, Mr.	....	L. 4	....	....	....	L. 2	6	..
"	....	P. 3	P. 3	....	....	....	..	6
Card, H.	L. 6	L. 191	L. 14	L. 2	L. 6	....	..	219
"	....	P. 2	P. 2	....	....	P. 1	..	5
Curtis, R.	....	L. 3	L. 1	....	....	....	4	..
"	....	P. 5	....	....	....	....	..	5
Welch, P	....	L. 6	....	....	....	L. 1	7	..
Hutchinson, Mr.	....	....	L. 1	....	....	....	1	..
Lloyd, Mr.	....	L. 8	L. 2	....	L. 1	L. 1	12	..
"	....	P. 4	....	P. 2	....	....	..	6
Fulton, C.	....	L. 1	....	....	....	....	1	..
"	....	....	P. 2	....	....	....	..	2
Swift, R.	....	....	P. 4	....	....	....	..	4
Grahame, Mr.	....	....	....	P. 4	....	....	..	4
Woitte, Mr.	....	....	....	L. 1	....	....	1	..
"	....	....	....	P. 1	....	....	..	1
Kearne, G.	....	....	....	L. 1	....	....	1	..
"	....	....	....	P. 4	P. 2	....	..	6
McAllister, D. K.	....	L. 7	....	....	....	....	7	..
"	....	....	P. 4	....	....	....	..	4
Vernon Orchard Co.	....	....	P. 1	....	....	....	..	1
Totals	....	....	....	....	....	....	310	86

Total captures: Larvæ, 310; pupæ, 86.

Worms captured in fruit by periods—

	Larvæ.
July	5
August	19
September	24
October	16
November	4
Total	68

The table of totals is made up as follows:—

	Larvæ.	Pupæ.
Okanagan Landing section—		
Captured in bands	303	81
Captured in fruit	65	..
Swan Lake section—		
Captured in bands	7	5
Captured in fruit	3	..
Totals	378	86

Comparisons and percentages—	1920.	1921.
Okanagan Landing	76	449
Swan Lake	48	15
Vernon Town	..	..

Percentage of increase or decrease, 1921 over 1920—		Per Cent.
Okanagan Landing area	Increase	590.80
Swan Lake	Decrease	68.75
Vernon Town		.....

Average increase on all treated areas, 363 per cent.

Kelowna Town Area.

Orchard-owner.	(1.) June 24 to July 13.	(2.) July 13 to July 30.	(3.) Aug. 9 to Aug. 20.	(4.) Aug. 21 to Sept. 1.	(5.) Sept. 10 to Sept. 20.	(6.) Oct. 20 to Oct. 31.	Larvæ.	Pupæ.
Rowcliffe, G.	L. 1	L. 1	....	....	....	....	2	..
Larsons, E.	....	L. 6	L. 1	L. 1	L. 5	L. 5	18	..
"	....	....	....	....	....	P. 2	..	2
Hill, A. E.	....	L. 2	L. 4	....	L. 2	L. 5	13	..
"	....	....	P. 2	....	P. 2	P. 2	..	6
City lots	....	L. 2	L. 3	....	....	....	5	..
Newbosh, H.	....	L. 2	....	....	....	....	2	..
Avender, F.	....	L. 7	L. 4	....	L. 3	....	14	..
"	....	....	P. 3	....	P. 2	....	..	5
Peneery, Miss	....	L. 2	L. 2	L. 1	L. 2	....	5	..
Goudi, L.	....	L. 2	L. 8	....	....	....	10	..
McDonald, B.	....	L. 1	....	....	....	....	1	..
Fletcher, G.	....	L. 4	L. 3	....	L. 1	....	8	..
Patterson, G.	....	L. 4	....	L. 5	L. 1	....	10	..
Bankhead Orchard.	....	L. 3	....	L. 2	....	L. 1	6	..
Calder, B.	....	L. 4	....	....	....	.. .	4	..
Green, Rev.	....	L. 1	....	....	....	....	1	..
Harvey, Mrs. W. D.	....	L. 18	....	L. 4	....	L. 4	26	..
"	....	....	....	Adult 1	....	P. 2	..	3
McCallum, H	....	L. 1	....	....	....	....	1	..
Lubasch, H.	...	....	L. 5	L. 3	L. 1	....	9	..
Message, Mr.	....	....	L. 3	L. 1	L. 5	....	9	..
"	....	....	....	....	P. 1	....	..	1
Stutridge, Mrs	....	....	L. 3	....	....	....	3	..
McCarthy, C.	....	....	L. 2	....	L. 1	....	3	..
Cameron, Mrs.	....	....	L. 2	....	....	....	2	..
McMillan, D.	....	....	...	L. 2	L. 1	....	3	..
"	....	....	....	....	P. 1	....	..	1
Braden, Rev.	....	....	....	L. 1	.	....	1	..
Rosse, J.	....	..	....	....	L. 1	....	1	..
Rattenbury, D.A.	....	....	....	....	L. 1	....	1	..
Clement, E. L.	....	....	....	....	L. 1	....	1	..
Williams, Mrs.	....	....	....	....	L. 1	....	1	..
Boyce, Dr.	....	....	....	....	L. 1	....	1	..
Curtis, G.	....	....	....	....	L. 1	....	1	..
Lloyd, M.	....	....	....	....	L. 1	....	1	..
Ford, Mrs.	....	....	....	....	L. 1	....	1	..
Dal Cal, F.	....	....	....	....	....	L. 2	2	..
McGeens, Mr	....	....	....	....	....	L. 3	3	..
Totals.	....	....	....	....	....	....	171	20

Total captures: Larvæ, 171; pupæ, 20.

Worms captured in fruit by periods—	Larvæ.
July	1
August	20
September	41
October	116
November	...
Total	178

Totals of material captured—	Larvæ.	Pupæ.
Taken in bands	171	20
Taken in fruit	178	..
Over-wintering material	49	2
Totals	398	22

K.L.O. Benches, Kelowna.—New area found October 12th, 1921. Taken in fruit in orchards, 23 larvæ. Number destroyed in culls and windfalls unknown.

Westbank Quarantine Area.—Banding operations consisted of one inspection for over-wintering material during May and early June, and four summer band inspections between the dates of July 15th and October 31st. No sign of codling-moth material showed up at any time throughout the season. A check was kept on part shipments of fruit and about 4,200 boxes in all were examined. Here again no sign of the worm appeared.

Walhachin Quarantine Area.—Banding operations consisted of five summer inspections and inspection of fruit on the trees; also the destruction of windfalls. During the season's operations reports state no material found.

CODLING-MOTH CONTROL COSTS, 1921.

Vernon District.

Gross cost to Department of Agriculture—Spraying—		
Arsenate of lead, 1,092 lb. powder	$ 349 44	
Supplies, materials, and repairs	387 92	
Gas and oil for spray-machines	79 20	
Two new spray-machines	1,334 00	
Customs and freight	433 57	
Freight and express on arsenate of lead	58 50	
Man-labour, 180 days at $3.75	674 00	
Man and team labour, 36¼ days at $8	290 00	
Storage on spray-machines	38 00	
		$3,644 63
Band and fruit inspection—		
Materials and supplies	$ 45 25	
Man-labour, 661 days at $3.75	2,478 75	
		2,524 00
General expense—		
Nine months' car expenses for transportation		346 60
Gross cost to Department of Agriculture		$6,515 23
Cost to growers (chargeable through Department)—		
Arsenate of lead, 1,008 lb. at 35 cents	$ 352 80	
Man and team labour, 101 hours at $1	101 00	
Man-labour, 252 hours at 50 cents	126 00	
	$ 579 80	
Gross operating cost to Department of Agriculture	$6,515 23	
Less cost to growers, collectable	579 80	
	$5,935 43	
Compensation paid city lot-holders	1,804 50	
Net cost to Department of Agriculture		$7,739 93

Kelowna District.

Spraying—		
Arsenate of lead	$ 267 52	
Supplies, materials, and repairs (approximate)	184 08	
Gas and oil	76 25	
Freight and express	3 25	
Man-labour, 65 days at $4.03	261 95	
Man and team labour, 39 days at $8.25	322 00	
Rent of spray-machine, man and team, 2 days at $20	40 00	
		$1,155 05
Band and fruit inspection—		
Materials and supplies	$ 74 35	
Man-labour, 715 days at $4.03	2,881 45	
		2,955 80
General expenses—		
Eight months' expense on car for transportation		225 90
Gross cost to Department of Agriculture		$4,336 75

Cost to growers (chargeable through Department)—		
Arsenate of lead, 836 lb. at 35 cents	$ 292 55	
Man and team labour, 316 hours at $1	316 00	
Man-labour, 187½ hours at 50 cents	93 75	
	$ 702 30	
Gross cost to Department of Agriculture	$4,336 75	
Less cost to growers (chargeable through Department)	702 30	
Net cost to Department of Agriculture		$3,634 45

Westbank.

Spraying—		
Arsenate of lead, 805 lb. powder	$ 257 60	
Supplies, materials, and repairs	110 55	
Gas and oil for spray-machines	45 25	
Freight and express	3 25	
Man-labour, 51 days at $3.78	192 78	
Man-labour, 15 days at $4	60 00	
Man and team labour, 20¾ hours at $1	20 75	
Rent of spray-machines, 30 days at $4	120 00	
		$ 810 18
Band and fruit inspection—		
Materials and supplies	$ 6 35	
Man-labour, 315½ days at $3.78	1,192 59	
		1,198 94
Gross cost to Department of Agriculture		$2,009 12
Cost to growers (chargeable through Department)—		
Arsenate of lead, 785 lb. at 35 cents	$ 274 75	
Gross operating cost to Department of Agriculture	$2,009 12	
Less cost to growers, collectable	274 75	
Net cost to Department of Agriculture		$1,734 37

Walhachin.

Spraying—		
Arsenate of lead, 150 lb.	$ 48 00	
Supplies, materials, and repairs	2 45	
Gas and oil for spray-machines	9 00	
Freight on lead	3 25	
Man-labour, 15 days at $3.50	52 50	
Man and team labour, 81 hours at $1	81 00	
Rent of spray-machine, 7½ days at $10	75 00	
		$ 271 20
Band and fruit inspection—		
Materials and supplies	$ 2 45	
Man-labour, 55½ days at $3.50	194 25	
		196 70
Gross cost to Department of Agriculture		$ 467 90

Cost to growers (chargeable through Department)—		
Arsenate of lead, 134 lb. at 35 cents	$ 46 90	
Man and team labour, 81 hours at $1	81 00	
	$ 127 90	
Gross cost to Department	$ 467 90	
Less cost to growers, collectable	127 90	
Net cost to Department of Agriculture		$ 340 00

Cost of Car-inspection Work.

Keremeos, cars inspected; wages	$ 351 00
Kamloops, cars inspected, 76; wages	351 00
Revelstoke, cars inspected, 333; wages	359 00
Materials and supplies	16 85
Total	$1,077 85

Cost per car for inspection, $1.67.

Suggestions and Recommendations.

For the coming season's operations, as closely as can be estimated, approximately 900 acres will be carried under control operations, divided as follows: Vernon, 390 acres; Kelowna, 460 acres; Walhachin, 50 acres.

Kamloops City is not included. In this case would recommend destruction of fruit. Twenty-six lots, carrying 235 trees, have been found infested; whatever method of eradication is employed the area under control would be larger than is indicated by the above figures, but would not be more than doubled.

Westbank and Vernon City.—We would suggest that bands be left on trees for the season, giving them two inspections; and if there be no evidence of the moth at these inspections, destroy all bands in the fall.

Vernon District.—Would recommend the regular spraying, banding, and inspection. In the Okanagan Landing section, owing to the extension of the quarantine area this season, the impossibility of hauling loose fruit to any of the packing plants, and lack of packing facilities in the section named, would recommend that an endeavour be made by the Department of Agriculture to finance the building of a temporary packing-house where fruit from infested orchards could be packed by community agreement among the different shipping organizations.

Kelowna City.—A similar plan of operation would be recommended; in this case we believe a suitable building could be rented at a nominal cost. On the K.L.O. Benches at East Kelowna we have the shipping organizations now working on a plan whereby one firm will agree to set aside their packing plant for the handling of all fruit from the infested orchards, each bearing their own proportionate share of packing operations.

In the Kelowna District would recommend the ordinary control operations for 1922.

Summerland.—It would be advisable to make a survey of orchards around the Experimental Station to ascertain the extent of infestation.

Kamloops.—In the city lots we would recommend, if at all possible, handling this problem by the destruction of blossom methods, and in this case omit spraying operations.

Appended are plans of operations and estimated costs for 1922.

Car-inspection Work.

Provision in the estimates has been made to carry Inspectors for this work, as we believe they will be necessary to supervise the work, even in the event of superheating being put into effect.

Note.—At the time of writing, the fact has been established of further infestation extending to the property of Kelowna Land and Orchard Company, south of the properties found infested on the benches, which enlarges the problem to a much greater extent.

SUMMARY OF 1920 CODLING-MOTH OPERATIONS OVER ALL AREAS.

Total acres under quarantine	727	
Total number of trees in areas	37,582	
Total number of boxes of apples inspected	31,309	
Number of man-labour days on spraying	326	
Number of man and team labour days on spraying	106	
Total	432	
Number of man-labour days, banding and inspection	1,981	
Total labour days	2,413	
Total labour costs of spraying and banding	$8,702 02	
Total cost of machines, supplies, transportation	4,626 98	
Total gross cost of field operations		$13,329 00
Foreign-car inspection—		
Number of cars inspected	409	
Cost of inspection per car	$1.67	
Number of man-labour days	239½	
Total labour costs of car inspection		1,077 85
Total gross costs to Department of Agriculture		$14,406 85
Less accounts receivable from growers for arsenate of lead	$1,684 75	
Less cost of new spray-machines on inventory	1,334 00	
		3,018 75
Net working cost to Department of Agriculture		$11,388 10
Division of net working costs—		
Field operations in all areas	$10,310 25	
Foreign-car inspection	1,077 85	
	$11,388 10	
Net working costs to Department of Agriculture	$11,388 10	
Compensation paid by the Department	1,804 50	
Total net expenditure by Department of Agriculture		$13,192 60
Net field operation costs	$10,310 25	
Car-inspection costs	1,077 85	
Net costs, operation and inspection	$11,388 10	
Growers' charges	1,684 75	
Gross operating costs to the Department		$13,072 85
Machines and equipment costs		1,334 00
Gross cost to the Department, all field operations		$14,406 85

Operating costs	$14,406 85	
Compensation costs	1,804 50	
1921 gross costs, control-work		$16,211 35
Less costs chargeable to grower	$1,684 75	
Less permanent equipment	1,334 00	
		3,018 75
1921 net costs, control-work		$13,192 60

All of which is respectfully submitted.

H. H. EVANS,
Assistant District Horticulturist.

REPORT OF DISTRICT FIELD INSPECTOR, SALMON ARM AND CANADIAN PACIFIC RAILWAY MAIN LINE DISTRICTS.

C. R. BARLOW.

W. T. Hunter, Esq.,
District Horticulturist, Vernon, B.C.

SIR,—I beg to submit herewith my annual report as District Field Inspector for the Salmon Arm District for the year 1921.

FIELD-WORK—PEST-CONTROL.

Codling-moth.—Following the discovery last fall of a new outbreak of codling-moth at Walhachin, control measures were instituted this year. An area of approximately 17 acres, containing 841 trees, was placed under quarantine. The trees in this area were all banded in the spring, and sprayed with arsenate of lead at the rate of 1 lb. of dry arsenate of lead to 40 gallons of water on the following dates: May 20th, June 23rd, and August 4th. The bands were inspected at intervals of ten days throughout the season, the last band inspection being completed on November 10th. The fruit on the quarantine area was closely examined before shipment and all windfalls destroyed. Your assistant is glad to report that no larvæ or pupæ have been discovered either in the bands or in the fruit this year.

During the month of August codling-moth was discovered in gardens in the City of Kamloops. A systematic inspection of the trees was carried out throughout the town, and the infested area appears to be confined to the east end of the town in the vicinity of the C.P.R. yards. This fact indicates the probability of the outbreak having arisen from moths or larvæ escaped from cars standing in the C.P.R. yards. It will be necessary to take steps to control the outbreak next year, and although the number of trees involved is not great, control will probably prove difficult owing to the inaccessibility of many of the trees. Recommendations for the control of this and the Walhachin outbreak are attached in appended form.

Anthracnose (Neofabraca malcorticis).—This disease is becoming widely distributed over the district, although at the present time it cannot be said to constitute a very serious menace, as its attacks are not so severe as in the moister Coast sections. Your assistant would suggest that some experimental work for its control be carried out.

While growers have had good results from the 8–8–40 Bordeaux formula, the weaker solutions which have been used with success in E. W. White's experiments at Keating, Vancouver Island, have not been given a careful test in the district.

Apple-scab (Venturia inæqualis).—Apple-scab, which is at present the most important of the diseases affecting apples in this district, has, owing to the dry season, not been as prevalent as is usual. The experimental work which was begun in 1919 in control of this disease was continued this season, and the results of the season's work are appended to this report.

Fire-blight (Bacillus amylovorus).—Fire-blight has been very prevalent throughout the district as far west as Notch Hill, the Salmon Arm section being the most severely affected, and much of your assistant's time has been taken up with work connected with its control. A systematic inspection of all orchards susceptible to attack was made during the summer months, and the removal of the great majority of dangerous infections was thereby accomplished. This fall a

clean-up campaign was inaugurated and the growers requested to go over their orchards and to remove and destroy all "hold-over" cankers, and, having done so, to notify your assistant, who would inspect the orchard, and if it were free from disease would give the owner a certificate of inspection to post in a conspicuous position on his property. This work is occupying most of your assistant's time at present, and he is glad to be able to report that owing largely to the whole-hearted manner in which the growers are co-operating in the movement there is every prospect of a thorough clean-up being made.

San Jose Scale (Aspidiotus perniciosus).—This is still present in wild growth at Spences Bridge, but does not appear to be spreading. The cutting and burning-over of the infested brush patches has up to the present prevented the reinfestation of the orchards, but it is necessary to keep a close watch for its possible reappearance in the future.

Pear-leaf Blister-mite (Eriophyes pyri).—Pear-leaf blister-mite increased rapidly during the season 1920, but in the spring of this year the growers having affected trees paid careful attention to spraying, and the damage caused by the pest has not been severe in the majority of cases. Up to the present time the insect has confined its attention to the pear, and your assistant has not observed apple-trees to be attacked, and so long as this state of affairs exists it is not likely that the mite will become of great economic importance, as pears are not grown very extensively in this district.

Wheat-midge (Diplosis tritici).—Several hundred acres of spring wheat in the north end of the Salmon River Valley was infested with wheat-midge this season. In some cases the loss was very heavy, amounting to as much as 60 per cent. of the kernels in some instances. The control of this pest is very difficult, but an effort was made to have the refuse from the threshers destroyed, thereby to some extent reducing the number of pupæ wintering over. It will, however, be advisable for farmers not to plant wheat-crops for several years, or, if compelled to do so, to plant only fall wheat, as this is practically immune from attack. Barley and oats were not observed to be infested, although both these crops are sometimes attacked.

EXPERIMENTAL WORK.

Apple-scab Control Spray.—In the spring of 1916, 1917, and 1918 a series of spraying experiments were conducted at Salmon Arm, and by means of these the dates and intervals at which lime-sulphur should be applied to control scab with the greatest degree of efficiency were established. In 1919 a further series of experiments were inaugurated, using the intervals established by the previous series as a basis, with the object of determining the weakest solutions of lime-sulphur which could be used without sacrificing efficiency in control. While the results to date of these experiments indicate that considerably weaker solutions of lime-sulphur than those at present in common use will effectively control scab in this district, your assistant does not feel justified in recommending the use of these weaker solutions to growers, as the three seasons, 1919, 1920, and 1921, during which the experiments have been conducted, have been abnormally dry and consequently unfavourable to the development of scab. Your assistant therefore recommends the continuance of these experiments until such time as a season of normal or excessive rainfall proves or disproves the efficiency of the solutions.

Tabulated results of this season's work are as follows:—

Results of Spraying Experiments at Salmon Arm, 1921.

Plot.	Date applied.	Clean.	Scabbed.	Boxes per Tree.	Remarks.
1	L.S. 1–30, May 9; 1–35, May 26; 1–35, June 17	99.97	0.03	14	Early infection.
2	L.S. 1–30, May 9; 1–35, May 26; 1–35, June 17; 1–60, July 11	99.86	0.14	13	„
3	L.S. 1–35, May 9; 1–40, May 26; 1–45, June 17	99.50	0.50	14½	„
4	L.S. 1–40, May 9; 1–45, May 26; 1–45, June 17	99.17	0.83	17	„
5	L.S. 1–40, May 9; 1–50, May 26; 1–50, June 17	98.99	1.01	13	„
6	Check	72.16	27.84	7½	Infection at all ages.

Cover-crop Demonstrations.—The plots seeded to hairy vetch in the fall of 1920 showed a good catch this spring, but the growth of the plants was not very satisfactory, and although ploughing in was delayed as long as possible without endangering the moisture-supply of the fruit-trees, the resultant amount of green matter was small. In 1920 the plots were seeded broadcast in the first week of September, while this year a drill was used and the seed sown on July 15th; consequently a longer period was left for development this fall than was the case in 1920. At the present time the individual plants are a great deal stronger than at the same time last year, although the number of plants per given acre is not as great as was the case last year. In most of the bearing orchards of this district clean cultivation has been practised without cessation for many years, with the inevitable result that the moisture capacity of the soils in bearing orchards is very low, and competition takes place between the trees and the cover-crop for the available moisture, which usually checks the development of the latter. This factor renders it very difficult to obtain a satisfactory cover-crop at the first seeding, but it is expected that by continuing the process for several successive seasons the humus content of the soil will be gradually increased until a satisfactory stand can be obtained. In 1920 three different rates of seeding were used on three of the plots—namely, 25, 30, and 40 lb. per acre. Of these, it was found that 25 lb. per acre did not produce a sufficiently thick stand, and while 30 lb. per acre proved satisfactory, the plot that was seeded at 40 lb. per acre did not show enough improvement over that seeded at 30 lb. per acre to warrant the use of the extra 10 lb. per acre of seed. In consequence all plots were seeded at the rate of 30 lb. per acre this year.

MEETINGS.

Your assistant attended four meetings of the Board of Directors of the Salmon Arm Agricultural Association, four meetings of the local branch of the British Columbia Fruit-growers' Association, and seven meetings of the Board of Directors of the Salmon Arm Farmers' Exchange. At a meeting of the Magna Bay Farmers' Institute your assistant gave an address on "Pruning of Fruit-trees and Culture of Small Fruits."

PRUNING SCHOOLS AND DEMONSTRATIONS.

Five pruning-schools were held in the district this year—three at Salmon Arm, one at North Canoe, and one at South Canoe. Two of the schools at Salmon Arm were taken by J. Tait, of Summerland, and the balance by your assistant. A full report of these has already been submitted.

This work is much appreciated by the growers and many old pupils have applied to take next year's schools. At Magna Bay a pruning demonstration was held, which was attended by fourteen growers. Thirty-five pruning and grafting demonstrations were given to the growers at Salmon Arm and Sorrento, at the request of the growers there.

FIELD INSPECTION.

Owing chiefly to the prevalence of fire-blight this year this work has required closer attention than usual, and coupled with a large amount of visits to individual growers for the purpose of discussing other problems has taken up much of your assistant's time, sometimes, it is feared, to the detriment of other branches of the work.

FALL FAIRS.

Your assistant acted as judge of fruits, vegetables, and field crops at Lasqueti Island and Sooke Fall Fairs; of fruits at Ganges Harbour and of fruits and vegetables, in conjunction with H. H. Evans, at Victoria.

NEWSPAPER ARTICLES.

Several short articles dealing with the control of pests and diseases have been contributed to the local newspaper by your assistant.

SMALL-FRUIT COMPETITIONS.

This fall a small-fruit competition was organized in the Eagle River Valley, both raspberries and strawberries being entered. This venture is of a purely experimental nature, but after a careful inspection of soils and investigation of climatic conditions your assistant can at present see no good reason why small fruits should not be grown profitably in the Eagle River Valley. In your assistant's opinion there is a good prospect of raspberries and loganberries succeeding

fairly well throughout the Eagle River Valley; while strawberries should do well in some favoured localities. This valley has excellent shipping facilities and the advantage of a short haul to Prairie markets. The points covered by the competition are Solsqua, Boure, Malakwa, and Craigellachie. Seventeen competitors are entered in the strawberry competition and thirty-nine in the raspberry competition. The Canadian Bank of Commerce has kindly donated a silver cup as a trophy. The plantings will be made in the coming spring. Full details of this competition will be available in the coming year.

OFFICE-WORK.

This branch of the work is becoming more and more onerous and makes it increasingly difficult for your assistant to efficiently carry out his field duties. A point will soon be reached at which it will be impossible for your assistant to carry out efficiently both the field and the office work without assistance of some kind.

GENERAL.

The tree-fruit crop has been heavy, and with the notable exception of Jonathan apples, many of which failed to hold up in storage, the quality has been good. A much smaller percentage of small apples were produced than has been the case for several years past. The trees have matured fairly well and moisture conditions are good, with a good protective covering of snow on the ground. There is at present a promise of a fair average crop next year.

Raspberries and loganberries produced an average crop and the new growth of canes is satisfactory.

The strawberry-crop was only fair, some damage being caused to blossoms by a frost which occurred on the night of May 27th.

The prices obtained for all small fruits were excellent considering market conditions, and brought the grower a very good net return.

Potatoes, while not a heavy crop, turned out better at digging-time than was expected earlier in the season. Other vegetables were about an average crop.

All of which is respectfully submitted.

CLAUDE A. BARLOW,
District Field Inspector.

REPORT OF DISTRICT FIELD INSPECTOR, KELOWNA.

T. M. ANDERSON.

W. T. Hunter, Esq.,
District Horticulturist, Vernon, B.C.

SIR,—I beg to submit herewith my annual report as District Field Inspector for the District of Kelowna for the year 1921.

FIELD-WORK—PEST-CONTROL.

Fire-blight.—This disease swept through the district at an alarming rate directly following the spring rains, which were heavier than usual and which brought about favourable conditions for the development and spread of the disease organism. Twig and blossom blight was very evident in every part of the district and showed up badly on the apples. On pears it developed rapidly and soon caused serious outbreaks on the main branches. Plans were made for a general clean-up campaign. The fire-blight and codling-moth meetings were well attended in this district and considerable concern was expressed concerning the fire-blight situation. Information was given so that any orchardists could recognize the cankers and understand the habits of the disease organism. Complete directions were given for cutting out cankers and the campaign got away to a good start. Inspection-work was started at once and it is expected that almost every orchard will be free from cankers before spring. An inspection card is placed on each orchard as soon as your Inspector is satisfied that the work has been well done.

Powdery Mildew.—This fungous disease has caused considerable loss during the past season and was particularly noticeable on Jonathan apples. A lime-sulphur spray of 1–50 applied during the latter part of the season acted as a safe control. This disease is attracting much attention and many growers are adopting methods of control by spraying and by the careful destruction of the terminal infections early in the season.

Blister-mite.—Several severe infestations of this pest have occurred on apples. These outbreaks have taken place where systematic spraying has been neglected. There is a general tendency toward more thorough spraying in the future and blister-mite will undoubtedly be affected.

Woolly Aphis.—This insect is unfortunately becoming too well established in the district. The winter of 1920–21 was very mild and this pest showed a rapid increase during the summer. No satisfactory control measure has been adopted. Certain eradication methods have been urged, but it is exceedingly difficult to control it on the tree-roots.

Codling-moth.—Control-work in the quarantine area in Kelowna has been very thoroughly carried on during the entire season under the direction of H. H. Evans. An outbreak of codling-moth was discovered in the orchards on the K.L.O. Benches toward the end of the season and has received the necessary attention.

Vegetable-insects.—The onion-maggot and the cutworm have again caused serious loss to growers in this district. It is very regrettable that the control measures outlined by the officials of the Department have not been adopted. In two cases where the instructions were carried out excellent and satisfactory results were obtained.

Fruit-pack Inspection.

During the packing season inspection of the pack has taken place as usual. The number of apples showing insect-injury of a minor nature this year was very great. The coming season will see much more thorough and systematic spraying and, it is hoped, fewer culls. A detailed report of the quantities of fruits and vegetables passing through the packing-houses and canneries has been submitted. At various times crop estimates and reports have also been furnished.

Fall Fairs.

Your official acted in the capacity of judge at the following centres: Prince Rupert, Terrace, Smithers, and Quesnel. Reports on these fairs have already been submitted.

Weekly News Letter.

A weekly report of general conditions of crops, etc., has been made to the Vernon office during the growing season for the News Letter.

Fruit and Vegetable Production.

The amount of fruit which passed through the various packing-houses this year will be a record-maker for the Kelowna District. Most of the fruit was in excellent condition and harvest was one or two weeks earlier than usual; and weather conditions were ideal, except for a destructive wind just before the Delicious were all picked. The mysterious falling-down of the Jonathan apple has again made its appearance. So far the cause has not been determined, but investigations are now being made which may lead to a solution. Owing to an apparent increase in injured fruits due to insect pests and other causes, growers would be well advised to send the low-grade fruits to the by-products plants instead of to the packing-houses. This would mean a considerable saving in time and money.

A much smaller acreage of onions was grown in this district during the past season and yields were not equal to the high average of the past. However, prices have been exceedingly good.

Tomatoes were not planted as extensively as usual and the crop was short, but the quality was good right up to the end of the season.

Pruning Classes.

In January three pruning classes were organized, with M. S. Middleton and Mr. Chesbro as Instructors. Forty-six pupils were enrolled and completed the courses of five days in each case. Four classes were held in November and December, with B. Hoy and M. S. Middleton as Instructors. Forty-two pupils were enrolled and completed the course. Judging by the appreciation shown and the application by others for class-instruction in pruning, this work has been of inestimable value and the service justified.

All of which is respectfully submitted.

T. M. Anderson,
District Field Inspector.

REPORT OF DISTRICT FIELD INSPECTOR, SUMMERLAND.

J. TAIT.

W. T. Hunter, Esq.,
District Horticulturist, Vernon, B.C.

SIR,—I beg to submit herewith my annual report as District Field Inspector for the Summerland, Peachland, Naramata, and Westbank Districts for the year 1921.

GENERAL ORCHARD AND CROP CONDITIONS.

The fruit-crop of 1921 for this district was very nearly up to early season estimates, being reduced by hail-injury and the consequent close grading in some sections. The movement of all fruit throughout the season was fairly free and very little, if any, congestion occurred at the various shipping-points.

The orchards of the district are in fairly good shape, considering the water-supply in many sections during the late summer and fall, and bud conditions are good. As a result of the active campaign which has been carried on by your staff throughout the valley recently to promote a more general use of cover-crops in the orchards, more seed has been sown for this purpose than ever before. Fertilizers are also being more generally used.

FIELD-WORK—PEST AND DISEASE CONTROL.

Codling-moth.—Quarantine operations on the Westbank area were carried out by the Kelowna staff this year and a closer check was possible on the work throughout the season than heretofore. As no larvæ were found this year, it is expected that the quarantine will be lifted in this section this year, as this concludes the third consecutive clean year on this quarantine area.

Codling larvæ were discovered on the Dominion Experimental Farm at Summerland this fall about November 1st. The area of orchards suspected were checked over as closely as possible, and as far as can be ascertained the infested area is confined to the orchards of the farm. Strict deblossoming quarantine-work will be carried on by the Dominion authorities on these orchards the coming year and a close check will be conducted by your official of all adjacent orchards.

Blister-mite.—This pest is now widely scattered in the apple-orchards of the entire district under my supervision. An active spraying programme for its control will be pushed forward the coming spring, as control methods have been carefully worked out by your assistant, based on the results of experimental work conducted this season.

Woolly Aphis.—This pest gave the usual small amount of trouble this season, but cannot be considered of major importance in this district.

Peach-root Borer.—Some slight damage from peach-root borer was observed in some sections.

Peach-twig Borer or Peach-worm.—Peaches and apricots were fairly clean of this pest this season, due to the fact that control sprays were reasonably well applied.

PRUNING CLASSES.

Two classes in pruning were conducted at Salmon Arm in January, 1921, by your assistant, a total of twenty-two pupils being in attendance. Separate reports concerning this phase of work have already been rendered. Assistance in conducting a pruning class at Summerland in December was also given the Instructor in charge, Ben Hoy.

THINNING DEMONSTRATIONS.

In June thinning demonstrations were conducted in this district by W. T. Hunter, District Horticulturist, Vernon, and the work met with the heartiest approval of the growers. Much improvement was noticed in the thinning-work of the growers as a result, and it is hoped that this work will be continued the coming season.

SPRAYING EXPERIMENTS.

Experimental sprays for the control of blister-mite on apple were applied on a series of orchard plots in the Summerland District, and effective control was obtained. A detailed report on this work is given below.

Dormant lime-sulphur, strength 1 to 9, was applied with a power-sprayer on a block of trees at the Balcoma Ranch, Summerland, by your assistant, the owner, R. V. Agur, co-operating.

The dates of application were as follows: March 21st, March 24th, March 29th, April 1st, and April 5th.

At the time of the first application the buds were practically dormant, although considerable swelling had already taken place. Separate groups of trees were treated, the whole being in one block of Newtowns which had the past season been seriously affected. The results were as follows:—

From spray applied March 1st, practically 100 per cent. control; March 24th, practically 100 per cent. control; March 29th, inspection in June showed a few odd twigs affected. April 1st showed a similar condition to the trees treated on March 29th. April 5th showed considerable infection. This would indicate that good control can be effected by lime-sulphur spray applied very early in the spring before the buds have made any appreciable growth.

The results of this work the past season show that the latest date of application which has been effective in 1921 was previous to the fourth week of March. These experiments will be continued next season if it is your desire, and the work, in the opinion of your assistant, should be elaborated to cover a little longer period of application, with particular reference to earlier applications. Acting on your advice, a fall spray has been applied on the block of trees and the results of these will be watched with considerable interest.

Fall Fairs.

The following fall fairs were attended and assistance given the Directors in judging grain, fruit, and vegetables: Keremeos, Pritchard, Lumby, Armstrong, Salmon Arm, and Peachland. Separate reports on this work have already been submitted.

Also assisted R. P. Murray, District Field Inspector, Penticton, to judge West Summerland Women's Institute vegetable-garden competition.

Meetings.

Attended all meetings during lecture course held in this district in February; was present at the inauguration meeting of the Okanagan Horticultural Club in September and the future meetings of the club. Attended the Western Canada Irrigation Association Convention held at Vernon in July.

All of which is respectfully submitted.

John Tait,
District Field Inspector.

REPORT OF DISTRICT FIELD INSPECTOR, SOUTHERN OKANAGAN AND SIMILKAMEEN DISTRICTS.

R. P. Murray.

W. T. Hunter, Esq.,
District Horticulturist, Vernon, B.C.

Sir,—I beg to submit herewith my annual report as District Field Inspector for the Southern Okanagan and Similkameen for the year 1921.

Insects and Pests.

Fire-blight (Bacillus amylovorus).—There was quite a serious blossom-infestation on such varieties as Spitzenberg, Jonathan, King, and Wagener under favourable conditions. This disease spread rapidly in some instances where growth conditions were favourable and irrigation-water was allowed to accumulate in small pot-holes. Control measures were immediately taken and the danger of a serious outbreak avoided. As many of the orchards are now being given considerable attention, growth conditions which favoured the spreading of the disease are greatly improved. It will be very necessary to keep a close check on all growers and severe measures will have to be taken where indifference is noticed, if this disease is to be stamped out in this district. Considerable time has been given during the dormant season, personal inspections being made of all orchards and certificates issued where no hold-over cankers have been found. This will greatly lessen the danger of blossom-infection and should contribute a great deal to the eventual stamping-out of the disease.

Blister-mite (Eriophyes pyri).—This pest is becoming more general in the Keremeos section and severe loss has occurred in some orchards where proper spraying has been neglected. Wherever the dormant spray (lime-sulphur 1 to 9) had been applied before the buds had opened satisfactory control resulted. This was demonstrated in one orchard at Keremeos that was badly infested. The spraying was done before the buds had opened and very satisfactory results were obtained. There was no injury to the fruit and a very small percentage of leaves was affected by the blister-mite.

The value of the dormant spray where properly applied was proven in the Kaleden District, where blister-mite has been serious on apples, particularly on Newtowns. Work was commenced on this pest last year and again during the season of 1921, with the result that it is almost completely eradicated.

Woolly Aphis (Eriosoma lanigera).—This insect is on the increase in the Penticton District. The rather mild winter last year favoured the wintering-over of this pest. Where control measures were adopted during the early infestations no further trouble was experienced, but more work will be necessary to control this pest, which is beginning to be serious.

Apple Powdery Mildew (Podosphæro leucotricha).—The past season was very favourable for this disease and in many instances considerable injury was done. Northern Spy, Jonathan, and Grimes Golden were most affected. With the lack of spraying-machines in the district a good many growers found it necessary to cut off and burn the diseased young terminal growth. Good control was obtained where lime-sulphur 1 to 35 was applied in the pink stage and again after the blossoms had fallen; where conditions are favourable to the growth of this disease a third spray should be applied about fourteen days later. An experiment was outlined in powdery-mildew control, but due to a misunderstanding on the part of the grower the second application was not correctly applied and the value of the experiment was lost, as there were no means left by which any deductions could be made. Another attempt will be made in the Penticton District to get some data on the control of this disease.

Peach-leaf Curl (Exoascus deformans).—For the first time in several years peach-leaf curl was quite prevalent during 1921, but there was no appreciable injury to this year's crop. Where dormant sulphur spray had been applied no injury resulted. A thorough spraying during the dormant season should be applied to avoid a possible recurrence.

Peach-twig Borer (Anarsia lineatella).—Peach-twig borer caused very little damage in this district, late peaches and apricots being less affected than the earlier varieties, although fruit from some poorly cared-for orchards was almost worthless.

Pear and Cherry Slug (Eriocampoides limacina).—Although a comparatively easy insect to control, one pear-orchard was almost defoliated with this pest. The outbreak was not general, although in one or two instances considerable damage was done.

Lesser Apple-worm (Enarmonia prunivora).—This insect is generally on the increase here and quite a large number of specimens were sent in, the growers confusing it with the codling-moth. Control measures have been advised, and if followed out very little trouble should result from this source. In the Penticton District the Wealthy suffered the greatest injury.

Demonstration-work with Cover-crops.

Hairy Vetch.—There has been a much larger acreage sown to cover-crop the past season than previously. Results obtained in the district on experimental plots of hairy vetch, and impressions gained by growers who took in the trips organized by the Horticultural Branch to the Wenatchee District, have been largely instrumental in the added interest in this phase of soil-improvement. Hairy vetch has been the most widely used and the results obtained from the crop fully justify its use. This refers more particularly to the Penticton District, where, toward the end of the growing season, there is a general shortage of irrigation-water.

Sweet Clover.—Sweet clover is being used to a limited extent and is being superseded by hairy vetch. The work involved in handling this crop and the difficulty experienced in working the orchard while this crop is growing tend to lessen its usefulness. As an orchard cover-crop it is not as adaptable as hairy vetch.

Alfalfa.—Several growers who took in the trips to Wenatchee were very favourably impressed with the results the growers of that district are obtaining with the alfalfa sod-mulch, but with the general shortage of water, particularly in the Penticton District, there is great danger of injuring the trees while the alfalfa is being established. One 8-acre block of Wealthy and

Winesap, rather favourably situated, was sown to alfalfa two years ago; the alfalfa is now quite well established and the orchard is in good condition. It would not, however, be advisable to recommend the widespread use of alfalfa here until the supply of water is improved.

In the Keremeos section, where there is an abundance of irrigation-water, the growing of alfalfa under the sod-mulch system should give good results. There are at present a considerable number of orchards growing alfalfa, but it is being cut for hay. Although this practice is not to be recommended, the trees are not suffering to the same extent as orchards under similar conditions in the Penticton District. It is rather difficult to make a grower realize that crops of alfalfa and apples cannot be taken from the same piece of land without considerably lessening the yield of both, even under the most favourable conditions.

It is interesting to note that in orchards where cover-crops were turned in for two or three seasons there is very little drought-spot, even in such susceptible varieties as Baldwin, Northern Spy, and King.

PRUNING-SCHOOLS.

The first pruning-school was held at Penticton during the early part of December, Ben Hoy being the Instructor in charge. Twelve pupils took this class and all were greatly pleased with the results. The second pruning-school will be held in Keremeos toward the end of January and another at Cawston toward the end of February. These schools are doing a great deal of good, as there are a large number of new settlers coming in who are not conversant with fruit-growing problems.

FIELD-WORK.

There has been a great number of inquiries for advice concerning practical orchard problems which meant considerable travelling. All such requests were attended to as speedily as possible and as much assistance as possible was given. A considerable amount of nursery stock was inspected during the spring and autumn, in addition to the other field-work.

FALL FAIRS.

The following fall fairs were visited: Penticton, where your Inspector assisted W. H. Robertson in judging fruits and vegetables; Kelowna, where he assisted H. H. Evans. Acted as judge at Nakusp and Arrow Park. Reports of these fairs have been submitted previously.

OFFICE-WORK.

The Department of Agriculture office is centrally located on Main Street. During the past season there has been a particularly large number of inquiries from residents in town relating to insect and plant diseases affecting vegetables and small fruits, all of which have been attended to.

GENERAL WORK.

Meetings were addressed at Cawston, Oliver, and Kelowna, chiefly on vegetable-growing. Your Inspector had the pleasure of conducting a party of twelve growers from the Penticton District to Wenatchee in June. All were very pleased and from new ideas gained felt fully repaid for the time and expense involved.

GENERAL CONDITIONS.

The early spring of 1921 was rather cool and moist, such conditions being favourable to the growth of plant-diseases. All tree-fruits, with the exception of sweet cherries, yielded well. In the Osoyoos and Keremeos sections the tomato-crop suffered rather heavily from the western tomato-wilt and the yield was greatly reduced in most cases. The potato acreage at Keremeos was small and the yield light.

Settlers in the Oliver District did not get on to their ranches early enough and the acreage planted to trees was small, but there promises to be a much increased acreage next season. The Oliver District seems to be particularly well suited to the growing of apricots, peaches, and sweet cherries, and quite a large acreage will be planted to these fruits.

All of which is respectfully submitted.

R. P. MURRAY,
District Field Inspector.

Vancouver Island. An ideal hot-weather pasture.

There are indications of the revival of the horse-breeding industry in B.C.

REPORT OF DISTRICT HORTICULTURIST AND INSPECTOR OF FRUIT PESTS, BOUNDARY AND EAST AND WEST KOOTENAY DISTRICTS.

E. C. Hunt, B.Sc.

W. H. Robertson, Esq.,
Provincial Horticulturist and Inspector of Fruit Pests,
Department of Agriculture, Victoria, B.C.

Sir,—I beg to submit herewith my annual report as Assistant Horticulturist and Inspector of Fruit Pests for the Boundary, East and West Kootenay Districts for the year 1921.

Crop Conditions.

The apple-crop throughout the district shows at least 100 per cent. increase over that of 1920 and will slightly exceed the big crop of 1919. Some sections, however, were short of their 1919 production. On the whole the quality of the fruit was above the average, good size, and a marked improvement in the pack sent out over that of previous years. Other tree-fruits show an average yield and sweet cherries especially brought good prices. The returns from most other tree-fruits were not so satisfactory.

The strawberry-growers have had a very successful season in the Kootenay. The production from the district shows a large increase, the crop at Wynndel being about double that of last year. The returns to the growers from this fruit on the whole were quite satisfactory. A good picking season and with most of the plantations under irrigation, the yield per acre was above the average. An average yield of other small fruits, with fair to good prices.

Vegetable production, other than potatoes, was about normal, but there is room for more development along this line in this district, especially among the white growers. Potatoes were a poor crop in many sections, and as the result prices have been good on the local markets.

Pruning and Packing Schools.

During February, March, and April of 1921 nine pruning-schools were held in the Kootenay District, with a total attendance of eighty pupils. Classes were held at the following places: By C. B. Twigg at Appledale, Slocan Park, Passmore, Canyon City, Erickson, and Creston; by the writer at Arrow Park, Nakusp, Gray Creek, and Procter. In November and December of this year one pruning-school was held at Grand Forks and a packing-school at Slocan Park.

The reports of these schools were sent in to the Department by the Instructors at the close of each school. Most of the schools were well attended and this class of work is very much appreciated by the fruit-growers in those sections where the schools were held.

Mr. Greenwood again had charge of the instruction at most of the packing-schools. These schools were held at Grand Forks, Kaslo, Erickson, Wynndel, Nakusp, Fauquier, and Needles, with a total attendance of eighty-eight pupils. Your assistant was in charge of the packing-schools at Grand Forks and Kaslo, and also by special request held a three-day class at Robson and Burton. From reports these schools have been a great help to the fruit-growers, and as a result a much-improved pack of apples was sent out from the district this season. Reports covering these schools have been submitted to the Department.

Notices were again sent out during November offering five-day pruning and six-day packing schools, and the popularity of this work is shown by the fact that at the present time applications are on file for ten packing-schools and five pruning-schools. Arrangement has been made to hold these schools during January, February, and March, 1922.

Diseases and Insect Pests.

Apple-scab.—This disease was not so prevalent this season, a very dry May helping to keep down early infections. Although even where growers put on the three recommended sprays, *pink calyx* and *14 days later*, considerable late infection took place on some of the most susceptible varieties. In a season like the past, with very dry weather in May, it would undoubtedly be best to put on a late "pink" spray and extend the time between the "pink" and "calyx," so as to have the third spray come on late in June. Unfortunately, it is not possible to forecast the weather far enough ahead to do this. As the seasons and weather vary a great deal each year, and as in most years in the Kootenay Lake, Kootenay River, Slocan and Arrow Lakes

sections the susceptible varieties (Snow, McIntosh Red, and Yellow Newtown) are liable to a late infection, the only safe recommendation for the control of apple-scab is the application of four sprays to such varieties. Three sprays will control scab on all varieties at Creston, Robson, and that section south of Castlegar to the boundary. The somewhat resistant varieties will only need three sprays for all sections of the Kootenay if thoroughly applied at the proper time.

Fire-blight.—This disease is still present in the Nelson area, but very few trees were found infected outside the city limits. Most all infections are confined to pear-trees, the Clapp's Favourite being the variety to which most damage has been done. Slight outbreaks of the disease were found at Willow Point, Slocan Park, Nakusp, and Fauquier. A thorough clean-up was made at these places this fall and further inspection of the trees affected will be made in the early spring. Although considerable work and time has been spent this fall in getting the blight cut out in the Nelson area, there is considerable work to be done yet before a thorough clean-up is made.

Pear and Cherry Slug.—The pear and cherry slug have been kept well under control in the commercial orchards. On the other hand, they were very bad on the pear and cherry trees on the city lots at Nelson, causing considerable damage to the foliage, which no doubt will affect the yield of next year's crop. These pests were most abundant during August and September, when a great many of the pear and cherry trees were stripped of their leaves. Articles were supplied from this office to the local newspaper dealing with the control of this pest and an effort will be made this next year to keep this insect well in check. The insect is quite easily controlled if proper spray methods are used. A good spraying outfit and some one to do the spraying are the main things needed to keep this pest under control in the city.

Colorado Potato-beetle.—This well-known insect has now gained a foothold in the south-east portion of East Kootenay. The area over which the beetle has spread is considerable and can be found in most of the potato-fields south of Elko to the Montana line. The beetle was also found as far west as Wardner. As regards its control, very little has been done except in the way of press articles written by Mr. Treherne and Mr. Eastham. A circular letter was also sent out to the secretaries of the Farmers' Institutes in this area, which gave instructions as to means of control and other information on the beetle. It is very difficult to stop the migration of the beetles and it is questionable if the beetle can be eradicated once it has gotten into a district, but if every potato-grower takes prompt eradicative measures should an outbreak occur its development can be kept in check.

Depredations of other insects were about the same as in previous years. In a few sections the blister-mite has made its appearance on the apples and some of the trees were quite bad with this pest for the first time. It will be necessary to make a special effort this next year to see that a controlling spray is applied for this insect in area affected. Oyster-shell scale is still troublesome in some sections, but is being easily kept in check where lime-sulphur is used for the control of apple-scab.

All of the above diseases and insects were attended to, as far as time would permit, by making personal calls on growers and giving advice and information on the methods of control and eradication.

COVER-CROP DEMONSTRATION.

This work is being carried on with hairy vetch in this district, as this leguminous crop seems to suit the Kootenay conditions much better than any other annual cover-crop so far tried out. The same orchard plots in the Kootenay have now been seeded for three years in succession and about the same amount of seed sown per acre (25 lb.) each year. This is the last year of the demonstration and much useful information has been obtained from the three-year test. Growers have been convinced that the use of such cover-crops are not only desirable, but necessary to keep up the fertility of their orchard soils. Better results will be had if the seed is disked or drilled in and should be sown early in August. The soil should be inoculated the first year and the same plot or area seeded to vetch for three years in succession; the amount of growth from the third-year seeding increases a great deal over that from the first. It would also be advisable to use about 35 lb. of seed per acre the first year and 30 lb. the second and third year. The disking-in of the cover-crop may be found more suitable than ploughing it in. The seed-plots that have been carried on have thoroughly demonstrated that hairy vetch seeds very readily in this district. By this means growers can produce a lot of seed that can be used for cover-crop purposes at very little cost.

Fall Fairs.

Fall fairs were attended in the capacity of judge of fruit and vegetables at the following places: Armstrong, September 21st and 22nd, assisted by J. Tait; Salmon Arm, September 28th and 29th, assisted by J. Tait; Kaslo, October 7th; and assisted by W. T. Hunter at the Creston Fair on October 4th and 5th.

Your assistant judged the fruit and vegetables at the Nelson Annual Flower-show held this year in July, and also judged the Nelson city-garden competition twice during the season.

Orchard Visits and Demonstration.

Many personal visits to different orchards throughout the district were made during the year; a great number of requests coming in from growers for demonstrations and advice on various horticultural subjects. This work takes up a great deal of time, but there is not much to show for it at the end of the year. It is always much appreciated and work that is very necessary and cannot be omitted.

In addition, your assistant has also given assistance to the Land Settlement Board on horticultural subjects pertaining to the soldier settlement area at Camp Lister.

Survey-work.

Your officials have just completed an orchard and small-fruit survey of the Kootenay District. This work was done as time would permit during the year. All field-notes are now in the office and it is hoped to have the cards used in filing this report completed very soon.

Inspection of Nurseries.

As in previous years, the work of inspecting the nurseries was carried out according to the regulation laid down by the Department. The Riverside Nurseries at Grand Forks is the only nursery operating at the present time in this district. Beside the summer inspection, a tree-to-tree inspection was made of this stock at digging-time this fall. Crown-gall and hairy roots were the main sources for which any of the trees were condemned. The stock on the whole was very clean, but a little short on growth. All trees condemned were destroyed at the time of inspection.

Crop Reports.

Crop estimates and reports are furnished from time to time during the growing season and at the end of each year a detailed report is made of the total production of all fruits and vegetables in the district. Information and data are also collected in a similar way from the jam-factories of the district. These reports have been submitted to the Department.

Office-work.

The volume of office-work has steadily been on the increase and necessarily had to be attended to. A large number of inquiries have been received from prospective settlers regarding the possibilities of fruit-growing in this district. These have been attended to, and whenever possible your assistant has called on the new settlers and personally advised them on the horticultural subjects that they were interested in. This, with the necessary correspondence with the Department, has taken up a great deal of time.

All of which is respectfully submitted.

E. C. Hunt,
District Horticulturist and Inspector of Fruit Pests.

REPORT OF DISTRICT FIELD INSPECTOR, GRAND FORKS.

PAUL C. BLACK.

E. C. Hunt, Esq.,
District Horticulturist, Nelson, B.C.

SIR,—I beg to report as follows:—

SEASONAL CONDITIONS.

Last spring opened up auspiciously with a good moisture content in the soil as a result of abundant rains during the previous autumn and plenty of snow during the winter. Field crops were therefore got in under excellent conditions and orchards had a good start with favourable weather during blossoming-time. All tree-fruits set well, with the exception of Jonathan apples; Wageners and Wealthys being especially well loaded. The ensuing dry summer, however (which appears to be a regular annual condition during recent years), very seriously offset the favourable spring and all crops suffered to a very great extent from drought. As a result field crops generally, and more especially potatoes (which are one of the main dependencies of the ranchers in this district), were very light. The orchards also suffered from the dry weather during midsummer, but with the advent of opportune showers later in the season made a marvellous recovery and produced good yields generally.

DISEASES AND INSECT PESTS.

The past season appears to have been most favourable for the development of these enemies of the farmer and fruit-grower. Spraying of orchards in this district has not been as general as it should be, and in view of the unusual prevalence of various pests during the season just past, and their apparent promise of increased depredations in the future, it behoves our fruit-growers to be up and doing in this matter and adopt a more systematic, aggressive, and thorough spraying campaign for the forthcoming and ensuing seasons.

In addition to such pests as green aphis and oyster-shell scale, which have infested the orchards to a greater or less extent in the past, there have been this year visitations, in some instances to a rather serious extent, of the following:—

Tussock-moth.—What might be called almost an outbreak of this insect occurred in some of the older orchards in the district. The pest was held in check by spraying with arsenate of lead, but timely and effective measures will have to be adopted to combat this insect this coming season.

Blister-mite.—This pest, while not previously unknown in the district, was unusually prevalent this past year. The injury was mainly confined to pear-trees, though in one or two areas apple-trees were quite badly attacked as well. A very thorough spraying with winter-strength lime-sulphur will have to be undertaken to destroy this insect this coming spring (just before the buds open), otherwise this pest threatens to become a serious menace to our orchards.

Leaf-hoppers.—These have been very numerous in many of the orchards this past season and timely applications of tobacco extract (Black Leaf 40) will have to be made to keep this pest in check.

Other insects appearing in lesser degree, but still of sufficient importance to warrant adequate control measures, were the red-hump caterpillar, the *Sphinx elegans* (one of the hawk-moth worms), and the peach-worm or peach-twig borer (*Arnarsia lineatella*), which occurred to a limited extent in plum-orchards.

Fire-blight.—This serious disease was slightly in evidence this past year, but only in restricted areas and appearing mainly as twig-blight; very little body-blight occurring. Drastic cutting-out of infected parts has been advised by your Inspector, and generally carried out by the orchardists, who fully realize the danger from this disease and the importance of dealing with it effectively.

Field crops in this district have been hitherto very free from insect pests. There occurred this past season, however, an attack (fortunately confined to an isolated instance) of the corn-ear worm (*Heliothis armiger*), which did considerable damage in the area noted. A statement from the Entomological Branch of the Department at Vernon (to which specimens of the worm were sent for identification) is to the effect that this is a new pest in British Columbia. It will doubtless have to be reckoned with in the corn-crops of the future.

Tip-burn, Mosaic, Early and Late Blight.—Hitherto the potato-fields in this valley have been comparatively free from attacks of fungous pests, but all three of the diseases named were noticed to a greater or lesser degree this past season. Systematic spraying of the growing plants will have to be undertaken in order to combat these diseases if profitable crops are to be grown.

Scab.—Very little scab is in evidence, due to the quite general practice of treating the seed with either formalin or corrosive sublimate.

PRUNING.

Practical assistance in pruning was given in several orchards. Quite a number of the ranchers in the district are new-comers and unfamiliar with pruning methods, and particular attention was given to these new arrivals.

THINNING.

Numerous demonstrations in the thinning of fruit were given, more particularly with apples, and rather striking results were noted at picking-time as a consequence. The owners of those orchards where thinning was demonstrated are enthusiastic converts to this desirable practice, and it is believed that fruit-thinning will be quite general in the future.

COVER-CROP DEMONSTRATION.

Two plots of 2½ acres each, in orchards in the east and west sections of the valley respectively, were seeded to hairy vetch on July 19th and 20th with seed supplied by the Department. Unfortunately the soil in neither orchard was sufficiently supplied with moisture at the time of seeding, and germination was poor in both cases. With the advent of fall rains, however, the vetch developed rapidly and made a good growth before the ground froze up, though the stand was more or less patchy. With the assurance of irrigation on at least a portion of the valley this coming season, it is hoped to continue this cover-crop work under more favourable conditions.

ORCHARD-SURVEY.

Under your direction a considerable amount of orchard-survey work was done by your Inspector in the Slocan Valley, the Fruitvale District, and the Arrow Lakes region.

INSPECTION OF NURSERY STOCK.

Owing to the absence of your Inspector on sick leave during the time of nursery-stock inspection at the Riverside Nurseries, this work was very kindly undertaken and carried out by yourself, assisted by C. B. Twigg.

CROP REPORT.

Information as to the crop returns for the district have been tabulated and submitted to the Department. The results of farm operations during the past season have not realized the hopes and expectations which characterized the attitude of the farmers and fruit-growers at the beginning of the year. While the apple-crop, which, though not a record yield, was fairly large, and materially augmented an excellent crop of pears and prunes, the prices for all fruit have been disappointingly low. And this notwithstanding the fact that the fruit-crop of the district was this year, for the first time in its history, marketed in an intelligent and businesslike manner; the fruit-growers profiting from past disastrous experience, having formed themselves into a co-operative shipping association embracing 97 per cent. of the ranchers in the district. Unfortunately, however, soon after shipments commenced, the market, as a result of nation-wide depression, slumped disastrously, and cash returns for the crop, more particularly for the earlier varieties, have been very poor. Complete returns for later sorts are not yet to hand, and these may relieve the situation somewhat.

A consoling feature of the situation remains, however, from the fact that the markets this year have broadened to a considerable extent and British Columbia fruit is better known to the world's consumers. This is a pronounced gain and the profits therefore will undoubtedly be reaped in the future.

MEETINGS AND NEWSPAPER ARTICLES.

A considerable number of farmers' meetings have been held in the district, at most of which your representative was present, and at some of which he read papers on timely subjects; early

in the year the matter of co-operation among the farmers was taken up and discussed, and your representative has the satisfaction of feeling that, in some small degree at least, he has assisted in contributing to the formation of the splendid organization which now exists under the name of the "Grand Forks Co-operative Growers' Exchange."

During the year a number of articles on various farm topics have been contributed to the local press, as well as to papers published outside the district.

General.

Systematic field inspection has been carried on during the season and frequent visits made to every farm not only in the main valley, but to the outlying districts as well. Your Inspector has been deeply gratified at the kindly attitude of the ranchers and their evident appreciation of whatever advice or assistance he has been enabled to give them.

Respectfully submitted.

PAUL C. BLACK,
District Field Inspector.

REPORT OF DISTRICT FIELD INSPECTOR, EAST KOOTENAY.

C. B. TWIGG, B.S.A.

E. C. Hunt, Esq.,
District Horticulturist, Nelson, B.C.

SIR,—I beg to report as follows:—

Lectures and Meetings.

A lecture on pruning was given by your assistant at a Farmers' Institute meeting last winter at Wynndel, Duck Creek. Papers were prepared on the following subjects: "Silos and Ensilage," "Spraying," and "Orchard Fertility," and were read by the Secretary of the Erickson United Farmers' Association at their monthly meetings held early in the year. An address was given on "Gardening" at a meeting of the Creston Valley Women's Institute during the spring.

Pruning-schools.

Pruning-schools were conducted by your assistant in early spring at Creston, Erickson, Canyon City, Appledale, and Slocan Park, in West Kootenay, and during the fall of the year a school was conducted at Grand Forks, in the Boundary District. A separate report of each was forwarded to your office at the close of these schools.

Camp Lister.

Your assistant was asked to superintend the planting of over 9,000 fruit-trees at Camp Lister during the spring, where returned soldiers are located taking up land under the Provincial Land Settlement Board. Twenty-seven 5-acre lots were marked out and trees planted 30 feet apart. The remainder of the trees were put in nursery rows. The area was visited several times during the latter part of the year and reports on the growth and condition of same were furnished the superintendent.

Orchard-survey.

Your assistant during part of the summer made an orchard-survey of the districts in and around Kaslo, Mirror Lake, Queen's Bay, Procter, Harrop, and Granite Road in the vicinity of Nelson, and copies were made from the field-notes of same in your office at Nelson.

Field Inspection.

Many orchards were visited in the various areas throughout the Creston Valley. Growers this year were troubled very much by the blemishing of apples and pears with the larvæ of the green apple-worm and the bud-moth.

In many instances green aphis, owing to the continued dry weather, increased in such numbers as to do apparent harm to young growth. Several growers for the first time included arsenical poisons in their spring spraying operations. The more general and frequent use of such will help to control many of the pests that cause complaints. Owing to dry weather during May and the general practice of spraying with lime and sulphur during the pink and calyx

stages of growth, the orchards of the valley this year were very free from scab. Early in the summer several specimens of clover-roots were sent in to me which were forwarded to Mr. Eastham, Plant Pathologist, Vancouver, for verification, and were pronounced to be affected with wilt-fungus (*Sclerotinia trifoliorum*), familiarly known as clover sickness, which causes more or less failure of this crop in other countries. On visiting various clover-fields I found two further infestations, and on making inquiries of the owners where the seed came from, I learnt it had been imported from across the line south. I informed the owners in each case that the best remedy was to plough the remainder of the crop under and refrain from planting legumes on the same soil for the next three or four seasons. This fall near Wynndel a strawberry-grower brought in several small larvæ which he reported doing considerable harm to his strawberries. The specimens were forwarded to Mr. Downes, Entomologist, Victoria, and he pronounced them to be a species of strawberry-weevil. This is the first time this pest has been reported doing damage in this district. The farm was visited and infestation was found in various locations. This fall the old plants were ploughed under, which leaves the spring plantation for next year's crop. The flat-headed borer was found on several young apple-trees at Camp Lister and in a few instances had completely girdled the trunk, causing the loss of the top. This can hardly be prevented, as transplanting causes a temporary check, which leaves them subject to attack by such insects while in a weakened condition. The Colorado potato-beetle has been spreading in the Baynes Lake area and this season has been reported as far north as Wardner. Pear-blight has been discovered in the orchard at the Indian Mission near Cranbrook. This fall a personal visit was made and the caretaker informed me that he was willing to remove the trees affected.

Fall Fairs and Garden Competitions.

Garden competitions were held at Natal and Nelson. The gardens were judged during the growing season and again later during the fall fairs by your assistant, who, acting as judge or assistant judge, attended the fall fairs at Natal, Trail, Fruitvale, Boswell, Nelson, Appledale, and Slocan City; also at the fruit, flower, and vegetable displays under the auspices of the Women's Institute at Willow Point and Harrop.

Crop Reports.

A survey of the district was made in midsummer to ascertain the acreage of spring planting to strawberries, potatoes, and other vegetables, and report of same submitted to your office. Monthly reports were forwarded to Ottawa on local conditions and crop estimates throughout the growing season; also rendered assistance in collecting data on the annual crop returns of the district.

Inspection of Nursery.

Assistance was rendered in the inspection of the nursery stock of the Riverside Nursery at Grand Forks during the fall when the trees were being removed from the nursery rows to the cellar.

General.

This year's season was marked by a long-protracted drought which resulted in light returns from all vegetables planted during the spring, the potato-crop being nearly a total failure, though this may be partially attributed to degeneration of seed. This is the third dry summer in succession and the growers have become interested in irrigation, to the extent that a small acreage at Erickson was brought under irrigation last fall. This year Canyon City growers have completed laying their pipe-line, which covers the greater part of their plantations; also Wynndel berry-growers this spring increased the acreage of their holdings under the Skinner system of overhead irrigation. On the other hand, the valley picked the highest yield of apples in its history. The majority of the trees are comparatively young, still increasing in size, returning substantial annual increases in fruit. The growing season was preceded by a mild winter with ample precipitation, which was able to be absorbed by and stored up in the soil owing to the absence of frost in the ground, which are the main contributing factors in the increase in yield. This fall the Creston District established central packing, which will standardize the pack and help to put the output on the market in a position to meet keen competition.

Respectfully submitted.

C. B. Twigg,
District Field Inspector.

REPORT OF AGRICULTURAL REPRESENTATIVE, KELOWNA.

J. E. BRITTON.

W. T. Hunter, Esq.,
District Horticulturist, Vernon, B.C.

SIR,—I beg to submit the following report of my work as Agricultural Representative for the Kelowna District for the year 1921:—

My work as Agricultural Representative has been carried on under the half-time co-operative plan with the Department of Education. I have shared with your District Field Inspector, T. M. Anderson, the Kelowna office, and many phases of the work has been conducted with reciprocal co-operation. In Mr. Anderson's absence I have been called upon to give assistance or advice in connection with inspection-work. I have devoted three days in the week to the duties of this office, but it has been found difficult to accomplish all that is attempted, due to the half-time limit; and it is not easy to quickly change from one field of thought and activity to another. Nevertheless, it is true that the class-room training helps one to be more exacting and explicit in the field.

The office-work grows in importance to the extent in which the public make use of its advantages. A great many calls are made by new settlers and information is sought on almost every subject connected with agriculture.

DEMONSTRATION PLOTS.

Attention and study have been directed upon orchard soils and their improvement, but it has been found impossible in the capacity of Agricultural Representative in this district to confine the work to this subject exclusively. In every section of the district growers are realizing the need for some changes in their orchard practices which will maintain fertility and better the soil texture. Cover-crops and fertilizers have been generally recommended. Many are anxious to establish the alfalfa sod-mulch system as followed in the Wenatchee District.

In order to encourage the work of orchard-soils improvement and to illustrate some of the best methods, a number of demonstration plots have been established in orchards which were considered suitable for certain tests and where the owner was willing to co-operate with the Department. Results of orchard experimental work in the semi-arid fruit sections of the West have been used as a basis for the work here. All semi-arid soils are deficient in organic matter. Irrigation and clean cultivation tend to change the physical texture of these soils and to exhaust the humus, so that sooner or later they reach a hard and lifeless condition. But there are in this district a number of distinctly different soil types which may show very different results under treatment with fertilizers and cover and shade crops.

Alfalfa.—The most evident requirement of the average soil is humus. Alfalfa will supply this, penetrating the subsoil, and in addition provides a shade-crop. Being a legume, it is of great value from this standpoint alone. Where it is already growing in the orchard and cutting for hay has been discontinued, results are very promising. Three alfalfa-plots have been established.

Plot No. 1 was seeded on April 4th, with a check-plot under clean cultivation. The alfalfa made poor growth except along water furrows. Weeds made a strong growth. No fertilizer was applied as this orchard received manure the previous season. Very little extra water was used. No difference in the trees could be determined. This owner wishes to seed his entire orchard to alfalfa the coming year.

Plot No. 2 was seeded to alfalfa on April 21st with 4 lb. of nitrose to each tree. The alfalfa-plot received 50 per cent. more water than balance of orchard. The alfalfa made excellent growth, reaching a growth of 4 feet in height. Weeds were plentiful but not troublesome. The trees are 11 years old. So far this appears very satisfactory.

Plot No. 3 was inaugurated to compare alfalfa with vetch and to determine the advantage of using nitrate when establishing alfalfa. The orchard was divided into three plots: (*a*) Alfalfa with 3 lb. of nitrate per tree; (*b*) alfalfa without fertilizer; (*c*) hairy vetch. These were established on June 11th. Water was used very liberally during the irrigation season. Very thorough work in preparing the seed-bed and in applying the irrigation-water have contributed toward most satisfactory results. This later sowing gave a more uniform stand of alfalfa and greater freedom from weeds.

Hairy Vetch.—In Plot No. 3 the vetch was seeded on June 11th with 50 lb. of seed per acre and the ground very well prepared. This is heavier seeding than generally recommended, but if necessary for the results obtained it is justified. This is the most satisfactory plot of vetch in the district. The vetch made very rank growth, completely covering the ground and just beginning to show bloom when frost came. It is expected that it will seed about July or August next and will then be disked in the soil. Roots which were examined showed a generous supply of nodules.

Later sowings have given a very poor stand which made little growth during the fall, but it is too soon to determine definitely the best date and amount for seeding. There is probably considerable latitude.

Plot No. 4 demonstrates hairy vetch with nitrate to promote immediate tree-growth and lime to improve the texture of the soil. A check was made on each of these. Twenty-five pounds of vetch was used and 3 lb. of nitrose per tree. Unfortunately the seed did not germinate well. The soil is a rather heavy clay and a very patchy growth of vetch was the result. This will be repeated in 1922 with a heavier dressing of lime.

Lime.—Judging from experiments conducted in both the Eastern and Western States, lime has not given results which would justify its general use in our orchards. (Pennsylvania Bulletin 121, Oregon Bulletin 166.) But some of our clay soils in this district may be greatly improved by lime before seeding to a cover or shade crop.

Plot No. 5 is on clay soil and the trees have not made satisfactory growth. A heavy dressing of lime was applied, leaving part of plot as a check. The trees each received about 4 lb. of nitrose. Cultivation was very thorough and by September the limed plot was in a much better condition, when the entire area was seeded to rye. The rye will be disked after spring growth and the soil worked up for alfalfa or vetch which will be seeded in June. The alfalfa sod-mulch system will be established.

Nitrate.—Nitrate was applied to ninety-six trees in Plot No. 6 at the rate of 4 lb. in two applications; 2 lb. before the snow melted and 2 lb. at first irrigation. The entire plot was seeded to rye on August 6th. The trees which received nitrate retained their leaves a little later and made satisfactory growth. The rye on the nitrate plot made a much heavier growth, showing that nitrate was evidently available after August. The cover-crop of rye was able to retain this.

Manure.—Manure has been applied to a number of Delicious and McIntosh trees, 11 years old, which had not beeen producing. The manure was applied early in 1920. In 1921 the trees produced a heavy crop.

Red Clover.—While not generally recommended, growers in the K.L.O. section have apparently procured very good results from red clover as a cover-crop.

In addition to the plots, observations have been made in many orchards where any form of soil-improvement was being adopted.

Distribution of Manures and Fertilizers.

Alfalfa and vetch are receiving most attention, but there is also an increasing demand for manure and commercial fertilizers. Following is a list of amounts sold in Kelowna during the year:—

	Tons.
Imperial, complete fertilizer	19
Other mixed fertilizers, including potash and phosphoric	31
Nitrose	65
Lime	30
Calgary rotted manure	1,350

Manure which is shipped in from Calgary has been costing the grower from $7.50 to $8 per ton in the orchard. It is believed that vetch will give as good results at a much lower cost, but the value of manure is easy to understand, and where quicker results are desired it is considered profitable. Rye as a winter cover-crop has been recommended where vetch and alfalfa could not be used.

Lectures.

During the year lectures have been given at the following centres: Ellison, Rutland, Mission Creek, Mission, and Glenmore. These have been on the subjects of: "How Plants Grow"; "The Orchard Plant"; "Soils and Fertility." General discussion followed each lecture and usually brought out some information of a local nature.

BLOSSOMING DATES.

During the blossom period observations were taken on the important commercial varieties of apples and pears as to the period of blooming. A table was prepared and placed in the hands of those willing to make the records for their particular district. The results are given in Appendices Nos. 6 and 7 for the K.L.O. section; the upper benches are somewhat later. The dates for Glenmore ran from one to four days later than the K.L.O.

These observations have brought out other questions. Several varieties were reported, "Heavy bloom but very poor setting." Experiments in Oregon (Bulletin 166) would indicate that trees lacking in vigour, probably due to lack of nitrates, make very poor set. Others are inclined to attribute a poor set of fruit to unfavourable weather conditions during the days blossoms are pollinated.

APPLE-THINNING DEMONSTRATION.

This demonstration was conducted by Mr. Harris, of the University of British Columbia, until his departure. It has since been completed and results tabulated in table attached.

In making observations, the yields as recorded do not show the actual results. Some of the small yields per plot or average per tree are due to a single tree in the row reducing the yield. With only five trees in a plot this becomes more striking. Indications are in favour of thinning from June 10th to 17th. English experiments have shown that little or no benefit to the following year's crop will be obtained by early thinning, and there is then the tendency to not thin enough. Plots 2 and 3 gave best No. 1 apples, as estimated, although others packed No. 1.

ORCHARD-HEATERS.

In a few of the orchards on lower levels spring frosts often cause damage to the fruit-crop. Eight degrees of frost were registered in one district last spring and the fruit-crop in that area suffered considerable loss. In one orchard the use of oil-burning heaters, twenty-five to the acre, saved the crop. Trees outside the influence of the heat had a very scanty crop, although equally laden with bloom.

FALL FAIRS.

For some years past it has been the custom of the Provincial Department of Agriculture to stage an educational exhibit at each of the fairs held in the Okanagan Valley. Representatives of the various branches co-operated this fall season in preparing a somewhat more comprehensive exhibit than has hitherto been shown. Mounts of the various insect pests and the damage done by them were displayed; specimens of diseased limbs and roots were on exhibit, and an official of the Department was present at all times to give advice on how to recognize insect pests and on methods of control. Samples of the various fertilizers commonly sold throughout the valley were prepared and placed on exhibit, together with samples of types of soils found throughout the district.

This exhibit created quite an interest and many questions were asked regarding the proper use of the different kinds of fertilizers. At such a time it was impossible to give definite advice upon many of the problems, but the names and addresses of interested parties were taken with the idea of visiting their ranches at some later date. It is planned to enlarge on this feature somewhat next year, as considerable information regarding orchard practice and the handling of orchard soils may thus be obtained. The following points were visited: Armstrong, Salmon Arm, Kelowna, and Summerland.

The interest taken in the exhibit this past season was sufficient to warrant the preparation of a more complete and permanent one for the coming year. Plans have already been laid for the assembly of material necessary for such an exhibit, and no doubt these will be carried through to completion. An educational exhibit at the various fall fairs not only serves to bring before the growers every phase of the work conducted by the Department of Agriculture, but enables Department officials to get in touch with many growers they otherwise would not meet.

All of which is respectfully submitted.

J. E. BRITTON,
Agricultural Representative.

REPORT OF AGRICULTURAL REPRESENTATIVE, VERNON.

V. B. Robinson.

W. T. Hunter, Esq.,
District Horticulturist, Vernon, B.C.

Sir,—I beg to submit the following as a report of the work under my supervision during the year 1921:—

Under the present co-operative scheme existing between the Department of Education and the Department of Agriculture, I am able to devote three days per week to the work of the latter Department. I find it difficult to make this time sufficient to accomplish the work I have set myself. As the work grows, as it is bound to do, I shall have to devote more time myself or be granted assistance. Not only do I find the matter of lack of time a problem, but I also find it difficult to carry on the two lines of work satisfactorily. In the middle of the week I have to drop the thread of my thoughts relating to the demonstration plots and not pick it up again until the first of the week. The difficulty of this arrangement is apparent when one tries it. On the other hand, the scheme of dual position has many features to commend it. I find the practical work of the field of immense value to me in the school-room and the training of the school-room of value to me in explanations in the field.

The lack of a definite policy of work when I first assumed duties in Vernon made it somewhat difficult to accomplish satisfactory results. Now, however, that a policy has been established and that I have become better acquainted with conditions here, I find that much progress is being made.

Demonstration Plots in Orchard-soil Fertility.

For some time past there has been a growing feeling among the growers of the Okanagan fruit-growing districts that their orchard soils were nearing the point of exhaustion. Some of the more progressive growers had already seen the danger and were attempting through the use of cover-crops and fertilizers to build up their soils. The majority were, however, waiting for the Horticultural Branch to advise them as to the most efficient method of handling this problem. It was upon your suggestion, sir, that in the fall of 1920 I undertook the problem of establishing demonstration plots in orchard-soil fertility. The plan was to start throughout the district a number of plots which would demonstrate to the growers the best practices of the leading fruit-growing districts of Canada and the United States. From the very conception of the work it was evident that these plots could not be called experimental, nor was it desired that they should be, for neither funds nor help were available to carry on the close investigations called for in all experimental problems. Most growers were acquainted, through their various horticultural papers, with the practices of the orchardists of other fruit-growing sections and many were asking regarding the adaptability of these to the Okanagan. No one was in a position to give a definite answer to these questions, and it was felt that information not based on the results of actual experience would be misleading and possibly useless. It was then, with the express purpose of furnishing the growers with first-hand information, that the demonstration plots were established.

Neither the time nor the funds were available to undertake more than a few treatments. As considerable interest was being shown in the alfalfa sod-mulch system of Wenatchee, the majority of the plots established were based on this method of keeping up the nitrogen and organic content of the soil. The usual procedure was to find some grower in the district who was interested in this line of work and to secure his co-operation to the extent of allowing us to use a portion of his orchard for demonstration purposes. A survey of the orchard was made and a block suitable to the purpose was chosen. Plans were then drawn up showing the exact treatment each portion of the block under observation would receive. A copy of these were placed in the hands of the grower, whose duty it was to see that they were carried out by supplying the necessary material and labour. During the growing season regular visits were made to each of these plots and notes taken on their development.

Summary of Results.—Although careful observations were made during the season, at picking-time no outstanding differences were noticeable. This was to be expected, as the majority of investigators, both Canadian and American, agree that results are not evident until the second year at the very earliest. Next year it is possible that some results will be evident,

but other plots will have to be carried on to the third and even the fourth year before we will be in a position to make any definite statement regarding them.

Each of the various types of plots is described in detail in the notes that follow.

DEMONSTRATION PLOTS DEALING WITH SULPHUR.

These plots were based on the results obtained in Oregon with sulphur as a fertilizer for alfalfa. The experiments referred to were conducted by F. C. Reimer and H. V. Tarter, of the Oregon Agricultural College Experiment Station. They are described in Bulletin 163 of that institution, entitled "Sulphur as a Fertilizer for Alfalfa in Southern Oregon."

Object.—These plots were carried on with the object of determining what effect, if any, applications of ground sulphur would have on the alfalfa in the orchard. It was felt that anything which would affect the growth of the alfalfa would affect the growth of the trees.

Districts.—Plots were therefore established in the Coldstream District and at Okanagan Centre.

Methods.—Uniform blocks of orchard were chosen for this purpose. Where it was possible three consecutive rows were treated with sulphur at the rate of 3 lb. per tree. The centre row was taken for demonstration purposes. The first and third rows in each case were separated from other treatments in the same orchard by blank or untreated rows. This method of using three rows to a block, we felt, would give more uniform results, and that the danger of results being interfered with would be minimized by basing results on the centre row.

This method of laying out the plots was not always possible, and at the Rainbow Ranch, Okanagan Centre, we had to use one row, the rows on each side of this being blank or untreated.

DEMONSTRATION PLOTS DEALING WITH NITRATE.

Based on results obtained by R. Larsen, Soils Expert, Wenatchee, County Washington. These have been outlined in press articles contained in the Wenatchee *Daily World.*

Stewart, of Pennsylvania, has also described experiments with nitrate in Bulletin 121 of the Pennsylvania State College of Agriculture Experiment Station, entitled "Fertilization of Apple Orchards."

Districts.—Two such plots were established in the Coldstream District and two at the Rainbow Ranch, Okanagan Centre.

Method.—There exists some difference of opinion regarding the best time to apply nitrate. Eastern growers are one in the practice of applying it in the spring. They state that if applied in the fall it would be lost to the trees because of its solubility. Larsen, of Wenatchee, however, states that in their district nitrate applied in the spring would not become available to the tree until late in the following fall. It is the general opinion that Vernon gets more moisture in the spring than Wenatchee, but no one seems to know whether this is sufficient to bring the nitrate into solution. It was therefore decided to test out the two methods of application. Plots were laid out according to the method described in the notes under the heading "Demonstration Plots dealing with Sulphur."

Results.—Because of the readiness with which nitrate becomes soluble, it was hoped that some results of the treatment would be evident the first season. In this we were disappointed, and because results were not evident it was thought best not to spend the time and expense in keeping accurate records of the fruit borne and the grading. After all, the plot is a demonstration plot, and unless the demonstration is perfectly evident to the average grower it has no value. Next season we should see some differences, if there are to be any. In the event that no differences show up in this particular method of treatment after two seasons' trial, it is probable that the work with nitrate will be discontinued.

DEMONSTRATION PLOTS DEALING WITH NITRATE AND SULPHUR.

These plots were outlined with the object of combining the work of Larsen, of Wenatchee, and Reimer and Tarter, of the Oregon Agricultural College Experiment Station.

Districts.—Two such plots were established on ranches in the Coldstream District and two others at Okanagan Centre.

Method.—Very fine sulphur known as "ground sulphur" was used at the rate of 2 lb. per tree. Nitrate was also applied at the rate of 3 lb. per tree. The sulphur, according to the reports of Reimer and Tarter, has shown itself to be an excellent fertilizer for alfalfa. The

nitrate was applied to provide against any check in the growth of the tree which the alfalfa cover-crop might exert until such a time as it was firmly established and returning nitrogen to the soil.

Results.—To date no results have been evident. It must be remembered, however, that it is too soon to look for any striking results and that the sulphur is but slowly soluble. Lumps of sulphur were found at the end of the season, which showed no effects of the weathering they had been subjected to.

DEMONSTRATION PLOTS DEALING WITH GROUND LIMESTONE.

Last season, for the first time, local lime was placed on the market in the form of ground limestone. This material has, according to the distributers, the following analysis: Si, 4.08 per cent.; Al, 0.08 per cent.; FeO_2, 0.54 per cent.; CaO, 53.02 per cent.; MgO, 3.32 per cent.; CO_2, 41.86 per cent. (lost on ignition).

This limestone would appear to have a satisfactory CaO content, as is shown by the following statement from "Fertilizers," by E. B. Voohees: "Chemically pure ground limestone contains 56 per cent. of actual lime, though the commercial product seldom contains more than 52 per cent. and varies from 42 to 54 per cent. of actual lime."

The only fault that could be found with this material was that it was coarse. Most authorities agree that for the best results all of the material should pass through a 10-mesh screen. Quite a portion of the local material was too coarse to do this. The matter was brought to the attention of the distributers and no doubt the material placed on the market this season will be more uniform.

As soon as it became known that this material could be purchased many growers asked this office for information regarding its use and value. Limestone is frequently found throughout the entire district and the wild flora is such as flourishes on a limestone soil; for these reasons it was felt that in most cases limestone applications would not prove advantageous; on the other hand, it was possible that in the case of the heavier clays an application of limestone might considerably improve the texture of the soil. In order to obtain definite information on both these aspects of the question of the application of ground limestone, arrangements were made for plots in both the Coldstream and Okanagan Centre Districts.

Method.—On these plots ground limestone was sown broadcast at the rate of 1½ tons per acre. It was used singly and in combination with other materials. Various soil conditions were selected to try out this material; thus at the Rainbow Ranch, Okanagan Centre, the block treated with ground limestone is one of stiff clay, but in the Coldstream it was tried on an open loam.

Results.—All authorities agree that, except in the cases of extreme acidity, the benefits of applying ground limestone are not as a rule apparent the first season. It was therefore natural to expect no results on the various plots so treated. It is quite possible that results will be evident next season, and for this reason the plot will be continued at least another season and carefully observed.

DEMONSTRATION PLOTS DEALING WITH THE INOCULATION OF ALFALFA.

This work was based on a desire to obtain exact information regarding the necessity of inoculating on our better types of orchard soils. There seemed to be a general opinion that it was not necessary, but the Horticultural Branch was not in a position to state definitely that they had tried it and shown that it was or was not essential. The Summerland Experimental Station had noted that on all of their legume-plots inoculation did not seem necessary. Larsen, of Wenatchee, stated that in their district it had shown no benefits, but that in the Leavenworth District it had shown results, and therefore he was of the opinion that it might prove of benefit here.

Districts.—Only one plot was chosen for this particular line of work, a ranch in the B.X. District, Vernon.

Method.—We learned that the owner of this ranch planned on putting a portion of his orchard into alfalfa. Accordingly he was approached with the object of securing his co-operation. The block of orchard he was planting was divided into three portions. On one the seed was inoculated according to the strength suggested by the company preparing the culture, on another the seed was sown in such a way that only one-half the amount of culture suggested was used, and on still a third no culture was used. During the season notes were taken from time to time

on the growth and development of the alfalfa, and in the early fall and at a later date plants were dug up for the purpose of examining the nodule-development under the different treatments.

Results.—The results obtained were in keeping with the general opinion of the district. We got no benefits from inoculation. It was found that nodules formed about the same time on all of the plants, but that a greater number of smaller clusters were found on the roots of the treated plots. It seemed that the bacteria had formed larger nodules on the untreated-seed plants, but that these nodules were much fewer in numbers than was the case with the plants on the other two plots.

The results obtained were so evident and so in keeping with Helmer's work at Summerland that it is felt that this particular treatment will not be continued this coming season; that we are now in a position to advise growers that on the better type of orchard soils it is not necessary to inoculate. In this connection it might be of interest to note that cases have been reported where inoculation has been necessary here in the valley. The type of soil probably had something to do with this failure to get a catch, and at some later date we may be in a position to try out plots on some of the poorer soils of the district.

DEMONSTRATION PLOTS DEALING WITH THE INOCULATION OF VETCH.

In the fall of 1920 some plots of hairy vetch were planted in the Okanagan Centre District with the object of comparing vetch with alfalfa as an orchard cover-crop. These plots did poorly and at the time this was attributed to poor climatic conditions. Still other plots were started in the Vernon District the following spring and early summer. As soon as the vetch in these made a start it was evident that it would soon outgrow the material planted at Okanagan Centre the previous fall. This led us to wonder if inoculation wasn't necessary on the particular type of light sandy soil found in the demonstration plot on the B. M. Whyte Ranch, Okanagan Centre.

Method.—Early in the summer individual plants in this plot were dug up and investigated for nodule-development. Occasional plants were found that were quite vigorous and seemed to have a sufficient number of nodules on their roots. From this it was presumed that the poor catch was due to the fact that the bacteria were not sufficiently spread in the plot. Accordingly it was decided to allow the plants present to set seed and then to scatter this seed by means of a disk harrow. In the fall this was carried out. In another portion of the same orchard on the same kind of soil two plots were sown to hairy vetch in the early fall. One of these was sown to seed that had been inoculated to vetch culture, while the other was sown to untreated seed. About the same time similar plots were sown in the B.X. District, Vernon.

Results.—Before growth had ceased in the fall the disked plot had shown a remarkable improvement. The seed that had been scattered germinated and all that could be desired in the way of a catch of vetch was obtained. This rather strengthened our belief that the poor catch of the previous season was due to a lack of inoculation, but the results obtained in the new plots sown with inoculated and uninoculated seed did not seem to support this. So far as could be detected, there was no difference in the two plots. Neither of them was making the satisfactory growth that the disked vetch was making. In the B.X. District this same lack of difference was noticeable, but here the vetch was making a satisfactory growth. There was considerable difference in the soil of these two districts, that in the B.X. being much the better. This difference might have been due to the difference in the soil, or the lack of differenec in both cases might have been due to the fact that the culture used was faulty. This same test will be conducted this next season.

DEMONSTRATION PLOTS WITH VETCH AND NITRATE.

On some of our light soils it was felt that some sort of building-up programme should be followed before the orchard was sown to alfalfa as a permanent cover-crop.

Method.—Two general lines of treatment were followed. In one the ground received an application of nitrate of soda before the alfalfa was sown. On the other hairy vetch was sown and allowed to reach its maximum growth and then turned under. Such plots were established at the Rainbow Ranch, Okanagan Centre. Here the vetch was sown in the fall of 1920 and the plan was to allow the vetch to grow as much as it would during the fall, to remain on the ground during the winter months, and to be turned under in the spring, at which time the alfalfa would be planted. Plots were also established in the Coldstream District. In this district the plan was somewhat reversed. Here the alfalfa was sown in the spring of 1921 and fertilized with nitrate. In the fall hairy vetch was sown on an adjoining plot. These two plots will be compared.

Results.—Because of the poor growth made by the vetch during the fall on the plots at the Rainbow Ranch it was not possible to turn the vetch under at the time planned. Indeed, early in the spring we were of the opinion that the vetch would never amount to anything and that we had better give up the idea of testing it with nitrate. In a short time, however, the vetch made most remarkable growth and by June was at least 2½ feet high and very dense. At this time it was turned under with a tractor disk so completely that not a trace of it was evident on the surface of the soil. The original plan was to sow the plot at once with alfalfa. This was not done, however, until early fall. This means that the plot stood bare for a couple of months. During this entire period the increased water-absorbing qualities of this particular block were very noticeable. The blocks included in this demonstration-work will be continued next season and watched with a great deal of interest.

All of which is respectfully submitted.

V. B. ROBINSON,
Agricultural Representative.

REPORT OF AGRICULTURAL REPRESENTATIVE, COURTENAY.

S. H. HOPKINS.

Dr. D. Warnock, F.R.C.V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I have the honour to submit herewith my annual report on the District Agricultural Representative work for 1921.

DISTRICT AGRICULTURAL OFFICE.

This office, opened in the spring of 1920, is being made use of increasingly by the farmers of the district. Many farmers' meetings are held here. New-comers or intending settlers especially find the office a reliable source of information. Correspondence was heavier than the previous year. The office was open every morning; afternoons (and often evenings) being occupied with outside work and visits to farms.

BUYING AND SELLING STOCK.

Owing to scarcity of cows locally, a trip was made to Saltspring Island in the spring and fifty head of cows and heifers were brought there for the Merville Settlement. These have given general satisfaction. Local sales were attended and about the same number bought, also several horses. Nine head of registered Jerseys (four bulls, five females) were sold through this office. A Pure-bred Stock-breeders' Association for the district is now in course of organization.

SMALL FRUITS AT MERVILLE.

A survey of the Merville Settlement and elsewhere in the district was undertaken in the spring of 1920, together with E. W. White, District Horticulturist, and G. A. Vantreight, Gordon Head, to ascertain the possibilities in small-fruit growing, especially strawberries, as these are the best of the small fruits for raw, unfertilized land. As a result, 60,000 strawberry-plants and 5,000 raspberry-plants were put in at Merville that spring and there is every prospect of a good crop this year. About 4 acres outside of Merville were also planted.

BOYS' AND GIRLS' COMPETITIONS.

Last spring entries were canvassed for with the assistance of local school-teachers in these competitions under the Department's auspices. Competitions organized were: Nine in chicken-raising, three in calf-raising, and one in pig-raising; eight or more competitors in each competition. The two latter were judged by the Representative. The parents and children seemed highly pleased with results. The group of pigs in the pig-raising competition obtained third prize in the Dominion Live Stock Branch car-load competition.

ORGANIZATION.

A good deal of time was spent in assisting the organization of local farmers' associations—namely, Comox Potato-growers', Fruit-growers', and Poultry Associations. These are now active. They have all made arrangements to do their buying and selling through the Comox Creamery co-operatively.

DRAINAGE SURVEYS.

Twenty-eight drainage surveys were made for farmers wanting the proper levels for under-drains and ditches. Where necessary a rough plan of drainage system was submitted for the farmer's guidance. At the same time orders were solicited towards another scow-load (50,000) of cement drain-tiles which is now on the way.

LAND SURVEYS.

Several requests from outside parties were received for the Representative to look over and report on certain parcels of land for agricultural purposes. This was done and a full report sent in each case. Letters of thanks were received.

VISITS TO FARMS.

These were made mostly at the farmer's request to deal with various problems that could only be dealt with on the ground, such as choice of crops, soil-management, insect and plant diseases, poultry and sheep diseases, selection of stock, potatoes, etc.

POTATO STANDARDIZATION.

The District Representative has been able to do effective work through the members of the local Potato-growers' Association along the lines and with the valuable co-operation of C. Tice, Potato Specialist. There is every prospect that Comox potatoes will become well known as the best, both for seed and market.

MEETINGS AND LECTURES.

Thirty-four meetings were attended during the year, covering the district; some of these were educational, some for organization, and the rest were Directors' meetings.

WRITING FOR PRESS.

Articles dealing with local agricultural topics were published weekly in the Comox *Argus*, constituting a sort of weekly bulletin, and the editor has given his hearty support to all work for the betterment of farming conditions in the district.

Respectfully submitted.

S. H. HOPKINS,
District Representative.

REPORT OF PROVINCIAL PLANT PATHOLOGIST, VANCOUVER.

J. W. EASTHAM, B.Sc.

Dr. D. Warnock, F.R.C.V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I have the honour to submit herewith my annual report for 1921.

NEW DISEASES NOTICED DURING 1921.

Wilt or Sclerotinia Disease of Clover (Sclerotinia trifoliorum).—Specimens of this disease on red clover were sent in from Duck Creek and Creston, both in the East Kootenay District, in April. An examination of the affected field at Duck Creek in May showed the injury from the disease to be quite severe, patches of considerable size being killed out completely, while elsewhere individual plants were dying. Sclerotia were abundant. There is no evidence as to how the disease has been introduced. It is a serious disease, since it can attack a number of leguminous forage-plants, including alfalfa. It was recommended to plough up the affected fields and to try sweet clover. While this may not be immune, it is at any rate considered to be resistant.

Buck-eye Rot of Tomato (Phytophthora terrestria).—This was found doing a certain amount of damage to the lower fruits in a greenhouse at Victoria, although it could hardly be described as very serious. The most objectionable feature of the disease is that in picking it is practically impossible to distinguish fruit in the earliest stage of infection. Such tomatoes after being packed rot in transit and damage the appearance of the whole package.

The disease was originally found and described in Florida and was later found at other Southern points. During the present year, however, it has been reported as occurring in greenhouses in Indiana, so that it would appear to have a wide range.

While cultures were not made, the gross characters of the rot and the fungus-growth on it, and the microscopic characters of the fungus, seem to leave no doubt as to the identity of the disease. Sporangia are produced in abundance on the fruit and these produce zoospores within a few minutes when placed in water under the microscope. Measurements, etc., agree with those given by Sherbakoff in his original article.

White-pine Blister-rust (Cronartium ribicola).—The most important event of the past year was the discovery of the presence of this disease in British Columbia. On September 10th some leaves and twigs of black currants were brought in to the office from North Vancouver with a request for advice. These showed mildew and other common troubles of currants, but some of the leaves also showed the telia of *Cronartium.* Samples were submitted to the Forest Pathologist at Ottawa to have the determination confirmed. Subsequently the disease was found elsewhere, at North Vancouver, at the University Farm, Point Grey, Chilliwack, and Sardis, Agassiz, Courtenay, Comox, Nanaimo, and Victoria, showing that the disease had already obtained a wide distribution in the Coast section of the Province.

The disease was found almost exclusively on cultivated black currants. In a few cases when these were heavily infected and red currants or gooseberries were growing side by side with them a slight amount of infection might be found on the latter. In other cases, however, although conditions were equally favourable to infection, red currants and gooseberries remained free from the disease.

It is rather remarkable that the disease should have appeared in the form of such heavy infections, apparently quite suddenly. In some cases, as at Courtenay, Comox, and Nanaimo, it might be considered that the disease had escaped observation simply because no inspection had ever been made, but this was not the case at Vancouver. The black-currant bushes at the University site, Point Grey, showed 100 per cent. infection this year. Last fall I was conducting classes for returned soldiers on the diseases and pests of small fruits and examination of these bushes for any pests or disease was made almost weekly. It is hardly likely that had the disease been present in other than a very light infection it would have escaped notice. It may be that climatic conditions during the past season have favoured the development of the disease into an epidemic. Last winter was unusually mild and leaves hung on the currant-bushes practically all winter. This would give the fungus a fair chance of wintering over by summer spores. On the other hand, it may be that some infected five-leaved pine produced æciospores for the first time last spring, resulting in heavy infection over the Vancouver area, and the same thing may have happened elsewhere.

So far we have no indication of how the disease came into the Province or from what foci it has spread. Considering, however, that the disease has been present from fifteen to twenty years in the Eastern Provinces and States and is common and widespread in Europe, it is hardly surprising that it should have gained entrance here before our quarantines against it were established. The prohibition against five-leaved pines and *Ribes* grown in Eastern Canada only went into effect in 1919, and we have evidence that the disease has been present on *Ribes* for five years or more. Whether it came in on *Ribes* or pines is not known, though the latter host is the more probable carrier. On it the disease may remain dormant for three to seven years or in exceptional cases even longer. Such infected trees, in the early stages at any rate, may show no indication of the presence of the disease. Port of entry inspection, therefore, or even inspection for a year or two after planting might not detect it, and it is not, of course, possible to keep such trees under continual observation or even to inspect them annually. After the white-pine blister-rust conference at Portland in 1919 an attempt was made to trace up and inspect the five-leaved pines that had come in since 1910. It was found impossible to do this in many cases, as they had been imported and distributed by nurseries which had since gone out of business. So far only two cases of infection on pines have been located. A few young white-

pine trees in a block of about 200 in the forest nursery at Stanley Park are believed to have produced æcia this year. These trees were planted out in 1915, being purchased from the Royal Nurseries as 2-year-old stock. It was said to have been raised from seed in the nurseries. The other instance of infection was found on some five-leaved pines imported from Europe and now growing in West Point Grey. The lesions had not produced spores and were apparently on 5- or 6-year-old wood. As the trees had been planted for nine years, this infection also must have occurred subsequent to planting.

After the discovery of the disease at the Coast my duties took me to the West Kootenay District, and I took the opportunity to do some scouting for the disease in this section. Black currants were inspected at Kaslo, Procter, Willow Point, Nelson, and Slocan City and found to be free from the disease. While this scouting only covered a very limited area of the Kootenay District, this area is the one probably most exposed to infection, with the possible exception of the country around Revelstoke. Further scouting, however, was not possible, as at this date (October 12th) most of the currants had lost their leaves.

Early in November Mr. Putnam, of the Blister-rust Control Office of the United States Department of Agriculture, came to Vancouver to make observations on the outbreak, and later he was joined by Dr. Bethel, of Colorado, whose aim more particularly was to determine to what extent native *Ribes* were showing susceptibility to the disease. Only one case of infection, I believe, was found on wild currants—namely, a light infection on a leaf of wild black currant. Red-flowering currants almost in contact with heavily infected cultivated black currants showed no sign of the disease.

Later Dr. Bethel and Mr. Putnam worked south from the International Boundary, finding the disease in cultivated black currants at a number of points almost to Seattle, when weather stopped scouting. One pine was found which had apparently produced æcia. How much farther south the disease may extend can only be determined next season, but there is no evidence that the outbreak in the State of Washington has originated from British Columbia. Conditions have been identical as regards importation in both countries and it is quite likely that there may have been a number of independent foci of the disease.

An international conference was called for December 18th, 19th, and 20th at Portland, Oregon, to consider ways and means for localizing or eradicating the outbreak. Considering that the Pacific States have some $200,000,000 worth of five-leaved pines (white and sugar pines) to protect, as against probably $5,000,000 in British Columbia, it was natural that some divergence of opinion should develop between the Canadian and United States delegates as to the degree to which drastic action should be carried. The chief point of difference was in regard to the necessity for destroying all cultivated black currants infected or exposed to infection; our currants being of more commercial value than in the United States and our white-pine interests less.

The Committee on Canadian Plans, therefore, brought in the following report, which is in the nature of a minority report:—

"*Report of Canadian Committee on Investigation and Plans for Control.*

"(1.) The economic value of western white pine in British Columbia is a matter of relatively little importance in the lumber industry at the present time. It does not compare at all with the values involved south of the International Boundary-line.

"(2.) This committee feels that the most important work that Canada can do at the present time, in view of the limited knowledge of the extent of infestation, is to establish and maintain an effective quarantine between the infected areas west of the Cascade Range and the remainder of the Province, which, so far as is known to date, shows no infection.

"(3.) The Canadian committee subscribes to the findings of the general committee on investigation and control, with the exception of the clause referring to immediate action in the matter of eradication of cultivated black currants. We are prepared to recommend to the Canadian authorities scouting and control measures referring to infected white pines, but cannot agree to recommend extreme action in the eradication of cultivated black currants at the present time, particularly in view of the peculiarly difficult situation in which infections have been found to date.

"This reservation is made for the present time only because of the lack of definite knowledge of the extent of the infestation and in view of the private interests at stake, and may be altered on the basis of future data and experience."

The only measure capable of being put into immediate effect was the placing of a quarantine to prevent the movement of *Ribes* or five-leaved pines from the infected area into the area of the Eastern part of the Province, presumably free from the disease. This is necessary, since, although white pine does not at present form a very valuable cut of lumber as compared with Coast timber, it is apparently the most valuable tree in that area and likely to become more so, since the reproduction in many places is almost pure white pine. According to one of the forest officials, this area is capable of growing $50,000,000 worth of white pine if the young stands are preserved.

It is necessary to include in the protected area most of the Dry Belt, since there are valuable stands of white pine to which access is obtained through the Okanagan. Furthermore, since it is not known that native *Ribes* may act as carriers of the disease, it is desirable to limit the disease to its present area as far as possible. Spences Bridge was fixed on for the eastern limit to which *Ribes* and five-leaved pines from the infested area could be shipped on the Canadian Pacific Railway and Canadian National Railways, and Princeton for the Kettle Valley Railway and Great Northern Railway. Further consideration showed, however, that it would be necessary to place some limitation on shipments along the Pacific Great Eastern and Grand Trunk Pacific Railways. North of the white-pine belt there is an area in which another five-leaved species, the white-bark pine (*Pinus albicaulis*), occurs, although chiefly at high levels. While this pine is of no commercial value, it is a potential host of the disease and might serve to establish it in the protected area if hosts from the infected area are allowed to reach Quesnel, Prince George, or even points farther west. It was therefore decided to recommend, in addition, that Lillooet on the Pacific Great Eastern and Hazelton on the Grand Trunk Pacific be made the eastern boundary of the quarantine area along these lines. The means to be taken to enforce the quarantine in respect to automobile and wagon traffic remain to be determined.

POTATO-WORK.

A large amount of time has been given to field-survey work on potato-diseases in connection more particularly with seed certification (in collaboration with Mr. Tice). Some of the more important results of this survey are tabulated in connection with Mr. Tice's report.

This season late blight was quite severe in the Chilliwack Valley and also occurred at other points in the Delta and Lower Fraser Valley. It was not found, however, elsewhere. This is encouraging, since, if in a season like 1921 potatoes can be grown in districts like Comox without danger from late blight, this should be very favourable to the production of a high grade of seed-potatoes. The absence of late blight has also a bearing on the matter of the Colorado beetle, considered below.

In last year's report notice was made of a recently observed disease provisionally known as "skin-spot." According to recent investigations in the United States, this is merely a particular form of powdery scab and therefore is of no special consequence.

Two years ago information was obtained that the Colorado beetle or "potato-bug" had entered British Columbia from Montana at Gateway, while last year it was reported to have reached Waldo. On account of the serious nature of this pest an inspection of this area was made, with the result that the beetle was found to be abundant near the boundary, and to extend in scattered infestations through Waldo, Baynes Lake, and Jaffray to just west of Wardner. At this last point the infestation was quite light, but occurred in a field by the side of the railway, so that there is danger of the insects having been conveyed to points west of this by passing trains. Careful inspection around Cranbrook and up the St. Mary Valley gave negative results. While the pest can be controlled by spraying, it must be borne in mind that, except in a small portion of the Province, spraying is unnecessary at the present time, and if the pest becomes general the whole cost of machinery and spraying will be incurred for this one pest. It would certainly, therefore, appear well worth while to combat the advance of the pest along the Crowsnest Valley into the Creston District and thence into the rest of the Province. While it is probably impossible to eradicate it, its advance can probably be slowed down materially.

FIRE-BLIGHT.

Fire-blight has been present in somewhat severe form in some parts of the Okanagan, although on the whole it has been kept under good control. An important extension in the area of the disease was discovered during the potato-beetle survey previously mentioned, quite severe

infection being found near Cranbrook. A number of trees will have to be taken out and a considerable amount of blight-cutting done. Fire-blight was also quite severe amongst pears in and around the City of Nelson. This means that the important fruit district of Creston is threatened by the disease from both east and west, although there is still a considerable disease-free area intervening.

Recently the Commonwealth of Australia placed a complete embargo on all trees or fruits of host-plants of the fire-blight organism from countries in which fire-blight is known to occur. This completely excludes British Columbia apples and pears from Australia. We have felt that this is an unnecessarily sweeping embargo, since we still have considerable fruit areas at the Coast, Keremeos, Similkameen, and Creston where no blight has ever occurred, and it was thought that shipments of fruit from such areas might reasonably be admitted into Australia under certificate that they were grown in districts in which no fire-blight existed. As yet, however, there has been no modification of this embargo. The recent introduction of the disease into New Zealand and the serious situation which has arisen there, in a country not prepared to combat it, may have had something to do with this. It is hoped, however, that we may ultimately obtain some modification in our favour, in which case it will be seen that areas free from the disease are of considerable importance. While our shipments to Australia have never been large, this trade, no doubt, is capable of being developed if some satisfactory arrangement can be made to protect Australian interests in respect to fire-blight.

EXPERIMENTAL WORK.

I again made the counts of anthracnose cankers in the plots of Mr. White's experiments. No doubt Mr. White has reported on these elsewhere. Spraying with Bordeaux mixture with excess of lime (Sanders formula) has been tried out in a number of places in the Kootenays this year along the lines of the experimental work followed at Willow Point last season. Owing to the nature of the season, however, russeting has been very severe. In some cases considerable russeting was found on unsprayed trees, but the trouble was much intensified with Bordeaux mixture. The question, therefore, of the superiority of lime-sulphur over Bordeaux mixture apparently will not be decided except by experience over a number of years, including all types of seasons.

Dusting-work was carried on again by J. J. Campbell, of Willow Point, the machine belonging to the University being used and the results checked by myself. The material used was Sanders Copper Dust, consisting of 10 per cent. dehydrated copper sulphate and 90 per cent. hydrated lime. Counts were made on October 12th on a representative Spy tree in a block which had received five dustings—namely, May 6th, 17th, 27th, June 7th and 22nd. The tree bore 504 apples, of which 102, or about 20 per cent., were scab-infected and about 2 per cent. russeted. This percentage is somewhat high as compared with the results of careful spraying.

The following is summarized from Mr. Campbell's record of costs and details of application. No insecticides were used.

Cost of Materials and Preparation.—A mixer costing $130 was to have been used, but did not arrive in time, so that mixing was done by hand at a cost of 15 cents per cwt.

1 cwt. dehydrated bluestone	$24 35
9 cwt. hydrated lime	18 25
	$42 60
Cost per cwt.	$ 4 26
Mixing	15
	$ 4 41

The amount used at each dusting varied from ½ to 1 lb. per tree, according to size of tree and stage of growth, more being required for a tree in full leaf than for the same tree in the semi-dormant stage. The trees were mature trees (around 15 years old). Two men and a team were used. On May 14th (pink spray) 350 trees were dusted in 3½ hours, 225 lb. of dust being used. On May 28th (calyx spray) 450 trees on about 9 acres were dusted in 5 hours 10 minutes, about 455 lb. of dust being used.

Miscellaneous.

G. S. Coward, B.S.A., was appointed as temporary assistant for the months of May, June, and July, being then transferred to the Soil and Crop Division.

In addition to my regular work, I gave a course of lectures in plant pathology at the University; two lectures on plant-diseases at the Y.M.C.A. short course in agriculture; and collaborated in the Dominion plant-disease survey and in the abstractions for British Columbia publications for *Botanical Abstracts*.

Respectfully submitted.

J. W. Eastham,
Plant Pathologist.

REPORT OF ASSISTANT ENTOMOLOGIST, VERNON.

M. H. Ruhmann.

Dr. D. Warnock, F.R.C.V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

Sir,—The following is a report on the routine work and a summary of the results of technical investigations and experiments conducted during the past year by the Senior Assistant Entomologist stationed at Vernon.

A full report of the technical investigations and experiments has been submitted to R. C. Treherne, B.S.A., Dominion Assistant Entomologist, in charge of British Columbia entomological work, under whose supervision the work was done.

The Senior Assistant Entomologist also attended to all inquiries concerning plant-diseases received at the Vernon office.

Correspondence.

Inquiries regarding control measures and identity of insect pests and plant-diseases were unusually numerous, and considerable time had to be given to the determination of material.

Library of the Department of Agriculture at Vernon.

The Senior Assistant Entomologist has charge of the Department library at Vernon. A fairly comprehensive reference library is now available, treating particularly on horticultural, entomological, and plant pathological subjects. This is supplemented with an extensive general reference library placed at the disposal of the Department by the Senior Assistant Entomologist. The indexing of the Department library is being carried on as time permits.

During the past year a few additions were made to the Department library by purchase, and a number of Experimental Station publications were received and also added to the library.

Photographic Work.

The Senior Assistant Entomologist is responsible for the official photographic work of the Department of Agriculture at Vernon. The equipment consists of: One Empire State camera, 5 by 7, with B. & L. Tessar No. 2B lens; one vertical photo-stand with electric-light adjustments; one Ingento enlarging and reducing camera for negatives to 5 by 7; one Micro camera, 3¼ by 4¼, with stand; a supply of the usual supplementary accessories for photographic work. A suitable dark room is erected at one end of the laboratory.

During the past year photographs were taken in connection with the technical investigations and experiments under way for record and for illustrative purposes. A number of lantern-slides were also prepared for lecture-work.

Collections, Entomological and Plant Pathological.

The Senior Assistant Entomologist is Curator of the collections. The entomological collection is at present stored in four cabinets, each with an eighteen-drawer capacity; two of these were added during the past year. These cabinets are supplemented with a large number of unsuitable storage-boxes which must be used until further storage facilities are available.

The principal orders of insects represented in the collection are the Lepidoptera, Hemiptera, Orthoptera, Diptera, Coleoptera, and Hymenoptera. The above orders are well represented; other orders have so far received little attention.

The material of the Orders Lepidoptera, Hemiptera, Orthoptera, and Diptera have been worked over and the majority of this material is now named. The material of the Order Coleoptera is being worked over by R. Hopping, Assistant Dominion Forest Entomologist for British Columbia, and is being arranged to conform with the new Leng Catalogue of North American Coleoptera.

The Order Hymenoptera is well represented, but has not been worked over and arranged owing to the dearth of literature on this order in the library and the difficulty of getting determinations by specialists in this large and important order. It is hoped that at least one additional cabinet may be added annually until a representative collection of British Columbia material is taken care of. At present many valuable and delicate specimens must be stored in unsuitable storage-boxes and are in danger of destruction by museum pests and accumulation of dust.

Few additions were made to the collection during the past year owing to lack of time for collecting, the only order receiving any appreciable additions being the Orthoptera, with material collected by R. E. Buckell, Assistant Entomologist, during his investigations in the Chilcotin area on the depletion of range grasses by insects.

The plant pathological collection is stored in Riker mounts, and is not yet a very representative collection of British Columbia material owing to the comparative dearth of material of an economic nature in the irrigated sections of British Columbia. It is hoped to add to this collection the poisonous plants and most important weeds and their seeds in the near future.

IMPORTANT INSECT PESTS OF THE YEAR IN THE DRY BELT.

Codling-moth (Cydia pomonella).—This important pest has increased its distribution during the past year; new infestations were recorded from Kelowna and Summerland. The areas under quarantine are showing considerable improvement. The Vernon City outbreak has been eradicated.

Lesser Apple-worm (Enarmonia prunivora).—This insect was in evidence to an unusual extent and caused considerable alarm in various sections of the Province, through the supposition that it was the codling-moth. It was the cause of considerable loss in apples and cherries.

Wax-moth (Vitula serratilineella).—The larva of this insect resembles the codling larva very closely and can only be definitely distinguished from it by miscroscopical examination, as is also the case with the lesser apple-worm in its early stages. This insect is usually considered to be a dried-fruit insect. During 1921, however, it appeared in considerable numbers in nearly mature apples, and was also bred in large numbers from combs in bee-hives.

Onion-root Maggot (Hylemyia antiqua).—The severest infestation yet recorded from British Columbia occurred during the past year in the onion-growing sections of the Interior. Heavy losses were recorded in the Okanagan Valley and also in the Kootenay Districts. Successful control experiments have been completed under Dry Belt conditions. (*See* summary of experiments following.)

Cabbage-root Maggot (Hylemyia brassicæ).—This insect was also in evidence to a greater extent than usual and caused heavy losses. Absolute control is possible at a comparatively low cost with the bichloride of mercury solution now recommended; the few growers who took advantage of this remedy suffered no loss.

Cabbage White Butterfly (Pieris rapæ).—The green larva of this butterfly in many instances completed the destruction not encompassed by the cabbage-root maggot. There is no reason why such losses should be sustained in the Province. The three principal insect pests attacking the cabbage-plant are the cabbage-aphis, the cabbage-worm, and the cabbage-maggot; these can all be controlled at little cost in time and material.

Blister-mite on the Apple (Eriophyes sp.).—This mite is presumed to be the same as that attacking the pear (*Eriophyes pyri*), but appears to require different treatment for control; so far efforts to control have not been very successful. Severe injury has been caused by this mite in some of the Oregon fruit sections and is now extending its range through the Lower Okanagan Valley. Experiments are under way for its control.

Woolly Aphis of the Apple (Eriosoma lanigerum).—Owing to the mild winter of 1920–21 this aphis wintered over on the trees, resulting in a severe infestation in all sections of the Interior.

Black Peach-aphis (Anuraphis persicæ-niger).—This pest has recently made its appearance in the Southern Okanagan and is causing much concern. No satisfactory control is yet known. Experiments will be conducted during 1922 and it is hoped that a satisfactory control may be found.

Peach-worm (Anarsia lineatella).—The larvæ of this moth were observed to be severe on both peach and prune.

Peach-crown Borer (Ægeria exitiosa).—This borer is troublesome on both the peach and prune. "Worming" is the only remedy at present giving satisfactory results in control. Experiments will be undertaken during 1922 in an effort to secure a more satisfactory control.

Oyster-shell Scale (Lepidosaphes ulmi).—This scale proved difficult to control during 1921 owing to an unusually long hatching period. The summer spray for this pest usually gives satisfactory results when applied at the right time. Growers, however, find it difficult to judge this correctly; consequently many are meeting with poor results. As the result of a small experiment conducted during the past spring, an experiment will be conducted on a commercial scale in the spring of 1922 to obtain, if possible, a satisfactory spray for the dormant season.

A *Cutworm (Mamestra trifolii)* was responsible for considerable damage to truck-crops and alfalfa in various sections of the Southern Okanagan; the same insect was submitted for determination from the Kootenay Districts, where it was reported to be also attacking the fruit of the apple.

Corn-ear Worm (Chloridea obsoleta).—This serious pest was simultaneously recorded from Summerland, Grand Forks, and the new Osoyoos settlement in the Southern Okanagan. This is the first record of this pest to come to our attention in British Columbia. Preliminary investigations will be conducted during 1922 in an effort to establish a measure of protection against this insect.

Douglas Fir Tussock-moth (Hemerocampa pseudo-sugata).—This insect is new to science and was first recorded in British Columbia by W. B. Anderson, Inspector of Indian Orchards, from Chase in 1918. It has now spread through several sections of the Interior, a severe outbreak occurring in the City of Vernon during the past year. It has also been recorded from Armstrong and Hedley, and has been found, in the bush, in several outlying sections of the Vernon District.

Wireworms (Elater spp.)—These insects were unusually injurious during the past year in all districts of the Interior, potatoes and grain-crops being the most seriously affected. No control measures are yet known; preliminary investigations and experiments will be undertaken for its control during 1922.

Wheat-midge (Thecodiplosis mosellana).—This pest was recorded for the first time from Salmon Arm during the past year. Infestation was severe and considerable loss of wheat reported.

Bud-moth (Tmetocera ocellana).—The larvæ of this moth were more in evidence than usual.

Leaf-roller (Archips rosaceana).—This larva was also unusually prominent during the past year.

Colorado Potato-beetle (Leptinotarsa decemlineata).—This beetle has become established in British Columbia and according to reports received may be expected to reach the East Kootenays during the coming year.

Thrips sp.? on Apple.—An injury to the fruit of the apple, supposed to be due to thrips, is responsible for a great deal of grading-down in the packing-houses. The injury is a prominent blemish in the shape of irregular white patches which appear on the fruit immediately on development. Investigations will be made during 1922 in an effort to definitely establish the cause of injury, so that control measures may be undertaken.

IMPORTANT PLANT-DISEASES OF THE YEAR NOTED IN THE OKANAGAN VALLEY.

The only disease of importance brought to our attention during the past year was fire-blight of the apple and pear. Infection commenced during the blossoming period in all sections and heavy losses were anticipated. Fortunately the weather conditions during the summer were such that infection began to check by the end of July, with the result that the epidemic did not extend

beyond severe twig-blight, except in very susceptible varieties. The number of trees destroyed by the infection was far less than was at first anticipated. An extensive campaign by the Horticultural staff for a thorough clean-up is proving very effective.

THE IMPORTED ONION-MAGGOT (HYLEMYIA ANTIQUA).

Summary of Control Experiment.—The control experiments during the season of 1921 were conducted on the same field and acreage as during 1920. The main experiment again consisted of a trap-crop of cull onions; these were planted in rows through the field 100 feet apart and spaced approximately 4 inches apart in the row and 2 to 3 inches deep. Seeding was completed on April 4th and the trap-crop was planted on April 14th; the procedure being to omit one row of seed every 100 feet, or approximately every eighty-fifth row, the trap-plants being set in the vacant rows. A block of approximately 1¼ acres of the field was set with twenty-five bait-cans, as used during 1919 and 1920, for the purpose of observing their influence on general oviposition.

Oviposition.—The first eggs were found on trap-onions on May 16th, when seedling onions were 1½ inches high and the trap-onions were 6 to 8 inches high. Flies were very numerous on this date and heavy oviposition was expected. Trap-onions for regular observation were staked on May 16th, on which date five trap-onions of an attractive type and five of an intermediate or non-attractive type were staked in the baited area; five of each kind were similarly staked in the non-baited area. Oviposition was first noted on May 16th, when eggs were found on trap-onions; the first regular count being made on May 18th, when as high as 103 eggs were collected from one trap-plant in the baited area and 261 eggs from one plant in the non-baited area. The highest individual counts for the season were made on May 20th, when 354 eggs were collected from one trap-plant in the baited area and 296 from one trap-plant in the non-baited area. The period of maximum oviposition on trap-plants extended from May 18th to 27th, with a daily average of 58.2 eggs from each of five trap-plants in the baited area and 85.45 from each of five trap-plants in the non-baited area. It will be seen from the oviposition chart that the trap-plants were quite effective to the day of their removal.

Oviposition on the Seedling Onions.—This was first noted on May 20th, when one egg was found; from this date on light oviposition continued on the seedling onions until after the first irrigation on June 4th and 5th; from this date the growth of the seedlings became more rapid and oviposition increased, but after the removal of the trap-onions on June 16th oviposition became so heavy on the seedlings that considerable loss was feared.

As was noted during 1919 and 1920, selective oviposition again became apparent about June 20th, when practically all oviposition took place on onions previously injured by maggots and recovering, or on plants of small and weak growth; the strong seedlings, forming the marketable crop, were but slightly affected.

Percentage of "Attractive Type" of Trap-onions.—During the season of 1920 it was noted that only 6 per cent. of trap-onions were of an attractive type; that is to say, only 6 per cent. of the trap-plants had made a growth which was particularly attractive to the females for heavy oviposition. The desirable type of growth is: Foliage spreading directly from or below the surface of the soil and without stem; colour of foliage paler than normal and flaccid; in other words, a weak, sickly growth. To determine the percentage of attractive plants this season, one full row of trap-onions, 198 feet long and containing 375 plants, was carefully checked over and found to contain: Attractive plants, 26; intermediate, 130; non-attractive, 219; total, 375; or approximately 7 per cent. attractive, 32 per cent. intermediate, and 61 per cent. non-attractive, making a total of 39 per cent. of the trap-plants on which oviposition was taking place.

As during 1919 and 1920, a secondary dipterous larva became very numerous from early July, being found only in onion-bulbs which were being destroyed by the larvæ of *Hylemyia antiqua;* the adult of this larva has been determined by Dr. Aldrich, of the United States National Museum, as *Muscina assimilis.* With reference to this species, Dr. Aldrich mentions in his letter: The larvæ of *Muscina* are found in various places where the scavenger diptera breed, and they subsist largely by preying upon the other dipterous larvæ. This is reported by Keilin in "Parasitology," VIII., 1917, pages 405 and 415.

No parasites were reared from onion-maggot material collected before July, but material collected after July 1st was found to be parasitized to the extent of 12½ per cent. by a cynipid parasite tentatively called *Cothonaspis gillettei* Wash.

Predaceous insects were very numerous and active from the middle of July until harvest and were responsible for the destruction of large numbers of the eggs of the onion-maggot.

During August, although the adults of the onion-maggot were very numerous, with every indication of heavy oviposition, it was difficult to find eggs that had not been destroyed.

The crop from this experimental field was handled under absolutely commercial conditions; the crop from these 9 acres exceeded expectations; the stand in the spring was light and very little thinning was done. An estimate of 12 to 14 tons per acre was considered high in early June owing to the expectation of considerable loss after the removal of the trap-plants. The actual crop marketed in the fall was 200 tons, or nearly 22¼ tons per acre.

The infestation of *Hylemyia antiqua* was considered to be the most severe yet recorded in the Okanagan Valley. Adults were exceptionally numerous during the whole of the season, appearing to be as plentiful during August as in the latter part of May.

General Summary.—(1.) Poison baits, although responsible for the death of a large number of the adults, do not materially prevent oviposition.

(2.) The trap-onions will take the major portion of the oviposition of the first brood of the imported onion-maggot during the most critical period of the growth of the seedling onions.

(3.) There is a partial third brood of the imported onion-maggot in the Okanagan Valley.

(4.) Thinning must be delayed until June 14th to 16th, at which time all trap-onions must be removed from the field and destroyed. Thinning of the seedling onions should be completed as soon after this date as possible, all infested seedlings being removed at this time and destroyed.

(5.) A certain amount of infestation cannot be avoided after the removal of the trap-plants; this will, in the course of five or six days after thinning, be confined to plants previously injured or of weak growth. These infested plants should not be removed from the field, as they are acting as a trap-crop for the balance of the season.

(6.) From the middle of July the imported onion-maggot is efficiently controlled by predaceous and parasitic insects.

(7.) The total cost in labour and material for this method of control does not exceed $1.50 per acre; there is a further loss of approximately 1.3 per cent. of crop-space through the use of the trap-crop.

(8.) This experiment has been conducted over three years under strictly commercial conditions and with unvarying success; it can therefore be strongly recommended to onion-growers under irrigated conditions.

DUSTING EXPERIMENT FOR THE CONTROL OF THE CABBAGE WHITE BUTTERFLY (PIERIS RAPÆ).

During early June an unusually severe infestation of the cabbage-worm was observed in a field adjoining that in which control experiments for the imported onion-root maggot were being conducted. It was decided that an experiment be conducted to control this pest by dusting. The grower undertook to provide the material and conduct the experiment under our supervision; a hand dust-blower was loaned to the grower, who was instructed to use a dust mixture of arsenate of lead and hydrated lime in the proportions of 1 lb. of arsenate of lead to 20 lb. of hydrated lime; this quantity was applied to 3 acres of cabbages by a Chinaman and completed in less than four hours. When the field was examined two days later no live worms could be found. It was found to be necessary to make several applications before the crop was harvested to give complete protection.

A similar experiment was conducted at Armstrong during the late summer on ½ acre of late cauliflowers, and although the adults were unusually numerous complete control of the worm was effected.

Respectfully submitted.

M. H. RUHMANN,
Assistant Entomologist.

REPORT OF CHIEF INSPECTOR OF IMPORTED FRUIT AND NURSERY STOCK, VANCOUVER.

W. H. LYNE.

Dr. D. Warnock, F.R.C.V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I have the honour to submit herewith a report of the work carried out by the Inspector of Imported and Exported Horticultural and Field Products and his staff of assistants during the year ending December 31st, 1921.

DUTIES.

As usual, all fruit, vegetables, rice, corn, peas, and beans imported into the Province were inspected at the several entry-ports where Quarantine Officers are stationed—i.e., Vancouver, Victoria, Nanaimo, Prince Rupert, White Rock, Douglas, Pacific Highway, Abbotsford, Huntingdon, Similkameen, Osoyoos, Bridesville, Myncaster, Midway, Grand Forks, Cascade, Rossland, Waneta, Kingsgate, Cranbrook, Newgate, Fernie, and Revelstoke. At Port Hill or Rykert, which is a public highway entry from the United States into Creston District, Mr. Rykert, Immigration and Customs Officer, looks out for fruit, etc., coming across the boundary in autos or other conveyances. Similar work is carried out by the other quarantine officials where wagon-road traffic is concerned. Special attention is also given to railway passengers and baggage crossing the United States boundary.

At Vancouver and Victoria a close watch is kept on all plant products from foreign ports, freight, express, and passenger effects all being subject to inspection.

SHIPMENTS TO POINTS EAST OF BRITISH COLUMBIA.

In co-operation with the Federal Division of Foreign Pest Suppression, all fruit and vegetable products billed as far east as Winnipeg are inspected and reported to the Division at Ottawa. Similar products for points east of Winnipeg are simply reported to Ottawa and are inspected by Federal officials in the Eastern sections. There is one exception to this rule in the event of products arriving liable to potato-tuber moth or fruit-fly infection, in which case they would be inspected at port of entry. If these particular shipments were infested they would not be permitted to enter the country. Other pests are dealt with according to their economic importance. A tabulated list of all imported fruit and vegetable products inspected at Vancouver and other ports of entry is included with this report. The quantity inspected during the year 1920 and 1921 is given by way of comparison. Another tabulated list includes the products that were condemned and shipped out of the country or destroyed.

Reason for Condemnation.—The imported apples and pears condemned was owing to their being infested with codling-moth larvæ and San Jose scale; peaches and plums infested with peach-worm (*Anarsia lineatella*), scale (*Aspidiotus*), and brown-rot; cherries for brown-rot; oranges for scale (*Aspidiotus* and *Mytilaspis*), brown and *Penicillium* rot; grapefruit for scale (*Aspidiotus* and *Mytilaspis*); tomatoes, tomato or corn-ear worm (*Heliothis armiger*); potatoes for *Fusarium* and *Phytophthora* rot; walnuts, wormy, rancid, and unfit for consumption.

IMPORTED NURSERY STOCK.

Complying with the Provincial and Dominion Quarantine Regulations, all imported nursery stock, trees, shrubs, and plants entering British Columbia, or imported into other parts of Canada by way of this Province, were inspected at the Vancouver Inspection and Fumigation Station. All outdoor deciduous trees and shrubs subject to fumigation were treated accordingly. The tabulated list attached to this report gives the quantity of nursery stock imported and also that condemned.

Reason for Condemnation.—The reason for condemnation was San Jose scale (*Aspidiotus perniciosus*), European scale (*Aspidiotus ostreæformis*), scale (*Diaspis, Mytilaspis, Chionaspis,* and *Lecanium*), affecting both fruit and ornamental trees and shrubs.

Many apple-trees were condemned owing to their roots being infested with woolly aphis (*Eriosoma lanigera*). Pear-trees were also condemned for another species of woolly aphis which seems to have appeared in the West during recent years. Its attack on roots of young pear-trees is almost confined to the destruction of the tender fibrous rootlets, to the extent of sometimes killing the tree.

Peach, apricot, plum, and prune trees were condemned for the peach-root borer (*Sanninoidea exitiosa*), root-gall, and scale-insects. A number of grape-vines from the United States were condemned for reason of their roots being infested with *Phylloxera devastatrix*. Blackberry and raspberry canes were condemned for root-gall and root-borer (*Bembecia marginata*).

Several nests of brown-tail moth were found on ornamental shrubs from France. Hundreds of the young larvæ were alive and ready to establish themselves in British Columbia. One egg-mass of the gipsy-moth was discovered on a *Castanea* shrub, also from France. Two weeks later a large colony of larvæ had hatched from these eggs, which had been safely imprisoned in a breeding-jar.

Certain species of American sweet chestnut were refused entry owing to chestnut-bark disease embargo.

Gooseberry and currant stock from Europe, Eastern Canada, and Eastern United States was also refused entry owing to white-pine blister-rust quarantine, for which all five-leaf pine-trees were included in the embargo.

Nursery Stock from all Parts of the World.

Several car-loads of ornamental trees and shrubs were imported from Holland, Belgium, and France; also a considerable number of rose-trees, rose-bushes, and mixed varieties of shrubs from England, Ireland, and Scotland. Several shipments of standard fruit-trees, shrubs, and vines arrived from the United States. A large shipment of standard fruit-trees from Japan made up the second instalment grown under contract from scions exported from British Columbia to Japan. Such procedure does not appear to be good policy, nor is it necessary. There is no good reason why such stock should not be propagated in our own Province.

It was necessary to condemn a considerable number of the trees for *Aspidiotus* and *Diaspis* scale-insects. There were the usual shipments of ornamental shrubs from Japan, some of which it was necessary to condemn for scale-insects and root-borers. The imported ornamental bulbs recorded in the tabulated list were mostly from Holland, Belgium, and France, though many came from Japan and some from China.

Exported Nursery Stock.

The following nursery stock and native shrubs were exported during the year, for which export certificates were issued: To the United States, 10 native shrubs, 7,000 apricot-trees, and 3 rhododendron; to England, 4 native conifer, cedar and hemlock; to China, 32 native shrubs and 2 grape-vines; to Japan, 258 native shrubs, 11 native plants, 3 rose-bushes, 3 apple-trees, 2 pear-trees, 2 cherry-trees, and 5 peach-trees.

Although the amount of stock exported is very small, the apricot-trees propagated by the British Columbia Nursery Company and exported to the United States deserves a complimentary remark. This particular stock was acknowledged by the nurserymen to whom it was shipped as being equal to any they had seen.

Storage Products.

Imported rice, maize, beans, peas, peanuts, and walnuts all underwent careful inspection for moth, beetle, or weevil, resulting in a considerable quantity being fumigated in order to destroy such pests.

There has been considerable improvement in the imported storage products during the last few years. This indicates that a great deal more care is being taken by shippers and is being insisted upon by consignees, who realize that the pests infesting such products soon rob them of all profit.

Quarantine Stations visited.

Your Inspector visited all quarantine stations with the exception of Prince Rupert. The Quarantine Officers in charge were questioned regarding details of their duties and additional instructions were given them when necessary.

Resignations and Appointments.

W. H. Whimster, Quarantine Officer at Fernie, B.C., during the last eighteen years, resigned on November 30th owing to advanced age. Mr. Whimster was also Police Magistrate during his service as Fruit Quarantine Officer. He was relieved by Mr. Kastner, whom your Inspector appointed to take Mr. Whimster's place.

Mr. Edgar was also appointed to act as Mr. Kastner's assistant in order to provide for occasions when Mr. Kastner's other duties as Deputy Sheriff prevented him attending to the inspection of imported fruit, etc.

POTATO INSPECTION.

Very few potatoes were imported during the year, amounting to only 203 tons, as compared to 9,812 tons the previous year. Shipments were mostly from the Western United States, some 30 tons being special new seed. There were also small shipments from China and Japan. Potatoes grown within the Province very easily supplied the demand for home consumption, with some to spare for export.

POTATOES INSPECTED FOR EXPORT.

During the months of March, April, and May the following amounts of the 1920 crop carried over the winter were inspected and exported: To the United States, 361 tons 240 lb.; Manila, Philippine Islands, 207 tons 800 lb.; Honolulu, Hawaiian Islands, 106 tons 500 lb.; Alaska, 2 tons 1,400 lb.; total, 677 tons 940 lb.

Commencing with the month of August and continuing to the end of December, the following amount of 1921 crop was inspected and exported: To Canadian points east of Rockies, 289 tons 800 lb.; United States, 139 tons 508 lb.; Manila, 1,226 tons; Honolulu, 200 tons 100 lb.; China, 100 lb.; total 1,854 tons 1,508 lb.

Total potatoes exported during the year 1921, 2,532 tons 448 lb.

POTATOES FOR HOME CONSUMPTION.

All potatoes sold for home consumption were inspected when requested by the shipper or consignee. Such requests were usually made in order to decide whether the potatoes qualified according to contract. As the result of experience gained in connection with several commercial transactions, it is evident considerable improvement could be made by amending the Dominion No. 2 grade, and possibly adding a third.

No. 2 grade differs so slightly from the No. 1 grade that it is of very little use in establishing market values. Under the circumstances, if a car of potatoes failed by a very small margin to qualify as a No. 1 grade, it could not qualify as a No. 2 and thus command a recognized market value.

It is not advisable to increase the allowance for fungus or bacterial rot, but more margin might be allowed regarding mechanical defect, for which so many of the shipments were disqualified.

A third grade would be of considerable service, to be known as sorted culls or trimmings. Such a grade would establish a market value for partly rotted potatoes discarded from the 1 and 2 grades, and from which the rot or other serious defects had been trimmed.

Following are the quantities of potatoes inspected for home consumption: Lytton, Ashcroft, and Kamloops, 50 cars; Lillooet, 58 cars; Lower Mainland, 15 cars. Estimated amount of potatoes in storage in Vancouver on December 31st, 1921, 2,424 tons.

APPLE EXPORTATION.

In compliance with regulations governing apples imported into New Zealand, your Inspector certified the necessary forms covering 20,450 boxes of apples exported to that country from the Okanagan.

NO AUSTRALIAN SHIPMENTS.

Owing to the Australian Government placing an embargo on trees and fruit capable of carrying fire-blight (*Bacillus amylovorus*) from any country where such disease was prevalent, there were no apples exported from this Province to Australia.

APPLES TO ENGLAND AND UNITED STATES.

Shipments of apples to Eastern Canada, England, and United States were inspected and recorded by the Dominion Box-marks and Grades officials in co-operation with our Provincial District Horticulturist stationed in the Okanagan and Kootenay Districts.

"EGGS MARKS ACT."

Since your Inspector was authorized to assist in enforcing the Provincial "Eggs Marks Act," H. Gutteridge and A. Irving, belonging to the staff of your Inspector, were appointed Eggs Marks Inspectors. Besides notifying merchants and egg-dealers regarding the Act, a special effort has been made to enforce the Act, especially as regards Chinese eggs.

In spite of all the large shipments of Oriental eggs by way of Vancouver going through to Eastern Canada, United States, and Europe, a few enterprising jobbers shipped some back to Vancouver. These they endeavoured to sell to local bakeries, who were immediately notified by your Inspectors regarding the "Eggs Marks Act."

The procedure of your Inspectors caused practically all the bakeries to refuse any contracts with the Chinese-egg jobbers. Some of the jobbers referred to are still trying to induce the bakeries to use the Chinese eggs, but are unloading their stock very slowly. Your Inspectors have given fair warning that an example will be made of any person or firm they can prove guilty of wilfully disregarding the "Eggs Marks Act."

OFFICE ROUTINE.

At the headquarters office of your Inspector, situated in the Court-house, Vancouver, a record is made of all inspection-work coming under his jurisdiction.

The monthly reports from each of the several quarantine stations are submitted and include all inspection fees collected. These after being recorded are forwarded to the Department of Agriculture at Victoria, as are also the monthly report and inspection fees of the Port of Vancouver.

The office dispenses information relating to insect pests, plant-diseases, horticultural and agricultural practice, both by interview and the departmental bulletins. Persons requesting bulletins mailed to them are informed they must apply to the Department of Agriculture at Victoria.

All correspondence is promptly attended to, the number of incoming letters for the year amounting to 1,036 and outgoing 1,299. Several hundred bulletins were distributed to those who cared to come and get them.

Considerable market information is always on hand. During publication of Markets Bulletin by British Columbia Markets Commissioner at Calgary, the local market items are sent to the editor each week.

This office is also in co-operation with the Dominion Bureau of Foreign Pest Suppression, Ottawa, and the Western Plant Quarantine Board of the Western United States, Mexico, Hawaiian Islands, and British Columbia.

The conference of the Western Plant Quarantine Board held at Victoria last June proved very useful by way of enabling us to get a better view of the several quarantine regulations in operation. This particular Board is composed of Quarantine Officers representing the Western United States, Northern Mexico, Hawaiian Islands, and British Columbia.

WHITE-PINE BLISTER-RUST CONFERENCE.

Your Inspector, in company with J. W. Eastham, attended the White-pine Blister-rust Conference at Portland, an account of which is included in Mr. Eastham's report.

SUPPLEMENTARY REPORTS.

The supplementary reports by H. Gutteridge and A. Irving, special Potato and Eggs Marks Inspectors on the staff of your Inspector, are attached to this report.

DISTRICT FIELDMEN ASSISTING.

The co-operation of the district men on the Horticultural staff by assisting in the inspection of potatoes for export from the Okanagan District was very much appreciated by your Inspector. By such an arrangement the Department avoided considerable expense. Six cars containing potatoes for export to Alberta, amounting to about 90 tons, were inspected and passed in the Okanagan District between October and December 31st. There were several more prospective shipments of the 1921 crop to follow.

Respectfully submitted.

W. H. LYNE,
Inspector of Imported Fruit and Nursery Stock.

REPORT OF ASSISTANT POTATO INSPECTOR, VANCOUVER.

H. GUTTERIDGE.

W. H. Lyne, Esq.,
Inspector of Imported Fruit and Nursery Stock, Vancouver, B.C.

SIR,—During the early part of the year the writer was engaged in potato-inspection work, consisting principally of car, pit, and storage stocks, together with the "Eggs Marks Act" enforcement.

Owing to the unusually wet fall of 1920, growers of the Lower Mainland were unable to dig and market their potato-crop for six weeks later than usual.

At the time of these unfortunate circumstances the wholesale dealers imported 423 cars from the United States, practically sufficient to supply the needs of the local market until the new crop came in. This unexpected condition, together with an indifferent export market, left large quantities of potatoes in the hands of the growers unsold.

Part of April was given to procuring statistics regarding Oriental owners and lessees of land in the following districts: Savona, Ashcroft, Lillooet, Lytton, Hope, and Ruby Creek.

The greater part of the summer months was given to the enforcement of the "Eggs Marks Act." A visit to the different bakeries disclosed the fact that Chinese frozen eggs were being used in minor quantities without proper placards and signs being displayed in accordance with the requirements of the Act. Offenders were duly warned of the penalties provided in the Act and agreed to discontinue the use of the Chinese product. This they are now doing, as confirmed by frequent visits of the Inspectors.

The latter part of the year the writer was engaged in potato-inspection work in Vancouver and the Lower Mainland. Considerable time was given to the Lillooet District, where the potato-crop was found to be much below normal in quality and yield. It was found that buyers insisted on No. 1 grade being put up in accordance with the Federal grading law, a standard which few growers possessed. This necessitated culling to the extent of 30 to 40 per cent., leaving an excessive amount of unmarketable stock on their hands. This condition also applies to Ashcroft and Kamloops.

It is the opinion of the writer that the growers are in need of a Provincial Grading Act of their own, framed by a wider margin of difference between Nos. 1 and 2 grades than the present Federal Act provides, which might better meet the above conditions by establishing a market value for each grade.

Your Inspector notes with satisfaction the increased interest taken in potato-growing by the Indians on the different reserves, having the past season produced approximately twelve car-loads and intending to increase their acreage in the future. They will greatly appreciate any expert assistance that will aid them in their work.

Respectfully submitted.

H. GUTTERIDGE,
Assistant Potato Inspector.

REPORT OF ASSISTANT POTATO INSPECTOR, VANCOUVER.

A. IRVING.

W. H. Lyne, Esq.,
Inspector of Imported Fruit and Nursery Stock, Vancouver, B.C.

SIR,—I beg to report herewith as Assistant Potato Inspector and Inspector under the "Eggs Marks Act."

POTATOES.

Owing to unfavourable market conditions and later in the season the operation of the United States Emergency Tariff, exports of the 1920 crop during the earlier part of the year were much lighter than usual; consequently inspections were considerably below the average. Pit and car inspections were made at various points throughout the Lower Mainland and also car and warehouse inspections in Vancouver.

A new feature in potato exports was the opening of a market for Lower Mainland stock in the Philippine Islands. Such shipments were inspected and went forward at monthly intervals throughout the greater part of the year, each shipment consisting of from 2,000 to 5,000 100-lb.

crates. Reports from Manila were to the effect that this stock was quite satisfactory, and the indications are for a continuance of this movement for a similar period during the coming year. Shipments to these islands are not affected by the operation of the United States Emergency Tariff.

In the month of August your Assistant Inspector visited the Ashcroft and Kamloops Districts for the purpose of inspecting export shipments of early stock and noting crop conditions. During the month of October and until November 15th inspections were made at points between Lytton and Chase, inclusive. It is an increasing practice among the buyers to contract with growers subject to Government inspection f.o.b. loading-point, and as a consequence many inspections were made in this service.

It was noted that rejections after the cars were loaded incurred much extra labour on the part of the growers, as such cars were usually unloaded and picked over. In order that this condition should be reduced to a minimum it was deemed advisable to carry the inspections back to the fields and pits, demonstrating there as to what could be shipped and what should be culled or otherwise dealt with. Every effort was made to prevent the loading of stock that would be rejected.

During the course of this work it was noted that many of the buyers contracted for stock which would be up to the requirements of No. 1 Dominion grade. Very few of the growers had stock which could be brought up to these requirements without much sacrifice and painstaking labour. It seems to be generally understood, however, that as long as the stock is reasonably well graded no insistence will be made on the grading being exactly up to these requirements.

It has, however, been noted that when the market weakens between the time of contracting and delivery there is a disposition on the part of some buyers to insist upon obtaining stock which grades up to the letter of the contract, or, as an alternative, obtaining a price reduction or cancellation of contract. The grower's position is indefensible in this matter as the contract is against him.

The remedy for this condition would appear to be in the hands of the grower, but unfortunately this is not so. With the exception of No. 2, a grade which only differs from No. 1 in a very slight detail, there is no other grade but No. 1 authoritatively defined. Buyers do not feel disposed to place contracts which do not stipulate some grade, as such a contract would perhaps leave them open to acceptance of potatoes of very inferior quality. The remedy would appear to be the establishment of grades with a sufficient range to cover the different qualities a grower may be able to market. Such grades would enable him to contract for just that grade he could deliver.

During the latter part of November and the month of December potato inspections were carried out in Vancouver. Late blight was found to be very prevalent in the Lower Mainland crop and very seldom was a lot inspected which could be passed without being culled over for this disease.

Eggs Marks Inspections.

Inspections under the provisions of the "Eggs Marks Act" were carried out throughout the year, special attention being given to the use of frozen canned Chinese eggs and egg products by the bakeries. A systematic campaign was undertaken, all known bakers' establishments being visited. The proprietors were provided with copies of the "Eggs Marks Act" and informed that the provisions would be strictly enforced. The result of this campaign was very gratifying. The use of the Chinese products was discontinued forthwith, occasionally at some loss to bakers who had contracted for further deliveries. Visits to the bakers' establishments were continued throughout the year as other duties would permit.

Wholesalers, importers, and retailers were also given attention and warned as to requirements of the Act as it affected them. Copies of the Act were freely distributed to those whom it would concern. Slackness in the observation of the requirements was checked whenever found. Owing to the numerous changes in management of the smaller retail businesses it was found necessary to do much policing of such establishments, as very often the new owners or managers came from beyond the Province and had no knowledge of the "Eggs Marks Act."

In following out inspections some difficulty was encountered owing to the restricted nature of the powers given Inspectors. As the Act only empowers Inspectors to visit premises where eggs are sold or offered for sale, such premises as where eggs were used (as in bakeries), stored, or processed were beyond the legitimate field of visit, and instances arose when entry was disputed

and in one instance denied. It must be apparent that only with the greatest difficulty can the Act be adequately enforced when entry to such premises is beyond the powers of Inspectors.

Respectfully submitted.

A. IRVING,
Assistant Potato Inspector.

REPORT OF PRAIRIE MARKETS COMMISSIONER, CALGARY.

J. A. GRANT.

Dr. D. Warnock, F.R.C.V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I beg to submit my report for the year 1921.

Early in January last your Markets Commissioner attended a conference of the Western jobbers at Winnipeg, and addressed them, calling attention to the great increase of small-fruit acreage which would largely be in bearing in June, especially strawberries, also to the condition of the jam-manufacturing industry, who were holding over large unsold stocks that were put up in a time of extremely high prices, which in order to save themselves would have to be sold before further manufacturing could be done. The need for an increased distribution of raw fruit and educating housewives to restock with home-made jam, with berries and sugar at a low price, also the need to stock up largely with jam-sealers (that were reported short), was emphasized and notes taken by the Secretary to provide this supply. Immediately after the annual meeting of the British Columbia Fruit-growers' Association was attended at Nelson, and the financial condition of the Prairies and elsewhere pointed out; the need for more united market quoting from British Columbia to prevent internal competition and the quick recovery of the market if this was done was featured. Addresses along the line of preparing the growers for reduced prices and the need of centralizing the organizations in an effort to try to prevent selling under the cost of production were delivered at Saanich, Hatzic, Salmon Arm, Okanagan Valley points, and in the Kootenay. Just before returning to the Calgary headquarters all important Prairie points were visited and the situation fully discussed with the jobbers, many of whom were apprehensive of the results of centralized shipping of perishables, which was fast becoming apparent that this method of marketing would be tried out. It was known that in raspberry shipping one central selling agency would control, and in strawberry shipping all but one organization would sell the same way.

MARKET REVIEW OF 1921.

The season opened with shipments of Hatzic rhubarb, which came forward in excellent condition in the new aerated crate. When ample supply could be obtained from British Columbia the Walla Walla supply was stopped. We are pleased to note that Hatzic has increased their acreage of rhubarb, and very soon we well look upon the Prairie rhubarb trade as ours in our season. Prices realized were good and no complaints, excepting shortage of supply, were made.

STRAWBERRIES.

Very few American strawberries were imported ahead of the British Columbia season, as the trade were well aware that the market would be fully taken care of when our berries commenced to roll. Fine weather favoured Hood River growers; their strawberries came on the Prairie market just before the Island and Lower Mainland berries, and the few cars that came in were good; this showed a marked contrast to the first three cars from British Columbia, which were picked wet and far too green. We immediately wired the condition of arrival to those in position to correct the mistake, after which berries began to arrive showing good pack and colour. Owing to continuous wet weather at shipping-point some mould was evident. When berries from Vancouver Island arrived they were expected to show exceptional quality, colour, and pack, and did not disappoint in this regard, but mould was in evidence sufficient to make jobbers hesitate to handle them for out-of-town shipment.

Precooled Magoon and Paxton berries from Hatzic, Mission, and Haney began to arrive in better condition than the uncooled Island berries. Wet weather kept up during the whole strawberry-picking time in Vancouver Island and Lower Mainland. The Wynndel, Creston, and Salmon

Arm growers were more fortunate; Wynndel shipped excellent dry-picked berries; the sale of so many understandard berries hurt their market. The following average prices for the season will show the exact condition of arrival as they were sold on the value showing at destination:—

	Wynndel.	Haney-Hammond.	Hatzic-Mission.	Gordon Head-Keating.
Winnipeg, per crate	$2 96¾	$2 72¾	$2 51½	$2 36¼
Regina, per crate	3 00	3 08	2 72	2 41½
Calgary, per crate	3 28	3 00	2 94⅝	2 96

The table shows that the short haul netted most.

None of the berries were sold on a f.o.b. shipping-point basis; all were sold from car by the brokers, and independent jobbers as well as those belonging to the car-sharing pool were supplied. Some 139½ refrigerator-car lots were shipped, not including the amount forwarded L.C.L.

Immediately on the completion of the main shipping season a visit was made to the Terrace District on the Grand Trunk Pacific Railway. W. H. Robertson, Provincial Horticulturist, Victoria, and R. G. L. Clarke, Chief Dominion Inspector, Vancouver, were met at that point, and after visiting the growers at Remo, Kitsumgallum, and Terrace a meeting was held and the growers addressed in field-work, packing, marking, and marketing. This is a promising young district, which grows berries (Clark's Seedling and Magoon variety) on the hill system. Their shipping season does not start until all other points are finished. When they can obtain satisfactory crates and better shipping facilities they will have an assured Prairies market; at present their market is chiefly found at Prince Rupert, Prince George, and Edmonton.

RASPBERRIES.

During the Markets Commissioner's visit to Terrace raspberries from Lower Mainland commenced to roll heavy to L.C.L. and some car-lots. The weather was ideal and quality excellent. Owing to the disappointing prices made by strawberries both in British Columbia and Prairie points, many who had signed up with the association broke away and consigned to wholesale and retail merchants in Calgary; the result was an immediate break in price. When this news was wired to Victoria your Markets Commissioner sent a wire to Calgary to feature the debacle in the bulletin and call for immediate returns on these shipments; the prices realized were also printed. When growers got their returns most of them got behind their organization and the market steadied; the few that continued to consign were responsible for keeping the price low. The demand was good, the berries excellent, and the first test of centralized selling was made; the result was that Prairie dealers reported the 1921 raspberry deal the best they had ever seen in any line of fruit marketing; they all got supplied; all bought at same price; it was sufficiently low to please the consumer, as well as to return the shipper a trifle over the cost of production. Had those berries been marketed otherwise, all but the consumer would have lost money, besides overworking express company employees in an effort to make transfers at junctional distributing-points, with resultant loss.

In all, seventy-four cars of raspberries were shipped, and with the exception of slight mould at end of the season, due to overripeness, no loss was reported. The following average prices show a reversal of strawberry prices, inasmuch as the distant shipments netted most:—

	Pacific Berry-growers.	British Columbia Berry-growers.
Winnipeg, per crate	$3 09½	$3 34
Regina, per crate	3 30	3 05
Calgary, per crate	3 29⅘	3 $23^{7}/_{10}$

A car shipment went to Chicago, which was delayed in transit and did not net as much as if it had arrived when that market was bare; the price was satisfactory. If this car had shallow-pint crates in it and could have entered Milwaukee, a better price could have been secured. The Canadian raspberry-crate contains 24 hallocks of ⅖ quarts, net weight 15 lb.; the standard United States crate contains 24 hallocks (shallow pints), net weight 18 lb. Any hallock not conforming to American standard must be marked "short." This little difference in

package practically means our being shut out of the American market, and we strongly urge a change to conform with the United States package; at least, to change the law to permit of experiments being made with the shallow-pint hallock.

LOGANBERRIES.

For some years past a few shipments of this berry have been made L.C.L. from the Lower Mainland; the result was in general unsatisfactory owing to moulding in transit. Salmon Arm had better results, but their berry does not grow to the size and retains an unsightly hull when picked that dealers objected to. This season a trial was made in shipping them in with raspberries in precooled cars under refrigeration in transit; these arrived in perfect condition and the large clean berries made quite an impression wherever they were offered for sale. Winnipeg had not seen them before, as they were an experiment; there the demand was not as great as in Alberta and Saskatchewan. Prices realized for the loganberries were equal to those obtained for raspberries; in some cases they sold at 25 cents per crate over raspberries. Only about one-tenth of the demand was supplied, as the shippers were awaiting assurance that they would carry to their destination before risking heavy shipments. Next year the demand for raw loganberries will increase; we do not think that the demand will ever reach to the proportion that strawberries and raspberries has reached. Shipments in car-lots were made from Washington to United States points as far as Chicago and very satisfactory prices obtained. Loganberries should be shipped in shallow hallocks, the same as raspberries and blackberries.

GOOSEBERRIES.

Gooseberries were more of a drag on the market than in any former year. Growers should reduce their acreage; there is little hope for them making cost of production for some years at least.

BLACKBERRIES.

Blackberries were shipped in car-lots for the first time and arrived in fine condition; prices were fully up to expectation and the supply under the centralized distribution was made to conform to the demand. Without organized assembling, precooling, and distribution this fruit would have been at the mercy of rival jobbers; car shipments would have been impossible. A hazel discolouring appeared on the Everbearing variety which depreciated their selling chances considerably.

BLACK AND RED CURRANTS.

Black currants arrived in excess of the demand; many were undersized and far from attractive. Chilliwack black currants were usually large and superior to those from up-country points. Red currants also slightly exceeded the demand. If these berries were confined to the large-sized varieties the demand for them would increase. They arrived in deep and shallow pints, usually poorly filled; some came in 4-lb. baskets. We recommend the deep-pint strawberry-hallock for all currants.

CHERRIES.

The Early Richmond and Governor Wood cherries are disappearing from the Prairie market. The first car-lot of British Columbia cherries arrived in Calgary on July 8th; they were largely Black Tartarians and Royal Annes, with some underripe Bings. The black cherry is the favourite here, Bings and Lamberts preferred. Tartarian, Deacon, and Royal Anne also find favour. Cherry prices remained firm during their season. Forty-four cars rolled to the Prairies from the Okanagan Valley alone. Several cars were rolled to Minneapolis and other United States points; they cleaned up with satisfactory prices. The strawberry-crate for fine-quality cherries finds favour in Winnipeg, while the 4-basket crate is popular in Calgary. Cherries were better graded this year and averaged equal to any imported stuff.

APRICOTS.

British Columbia apricots were small in size and many complaints were made about them. A large-sized apricot is demanded; the Tilson variety was the only one to give satisfaction; most of the arrivals were too small to pack. Considerable improvement is needed in apricots; the 4-lb. basket is most popular, but when of good size the peach-box is satisfactory. Low prices prevailed for apricots this year.

PRUNES AND PLUMS.

These fruits were imported in bulk just ahead of the British Columbia supply; they came from California, Oregon, and Washington. The varieties are the finest; size and pack exceptionally good, especially the plums; the package used was the 4-basket crate, excepting the Italian prunes, which came on the market in 16-lb. (suit-case) lugs. When British Columbia plums are ready the public have usually been satisfied, and sales of Pond's Seedling, Black Diamond, Peach plums, and such-like, do not bring satisfactory prices. We noticed that plums sold at very low prices this year. Italian prunes were forced on the Prairie market from United States points at prices far below their average price at home; this was done in an effort to clean up what seemed to be an overproduction or inability to place their usual contracts with dehydrating-factories. The size of the bulk of the British Columbia prunes shipped were under the average size from Washington; an effort should be made to increase the size. Many prunes were lost in transit by pilfering and being put in poorly made lugs; the size of the prunes will have to be increased or the slats placed closer.

APPLES.

Owing to the early season the market for apples was dull at the start. The early varieties arrived on the market in advance of the harvest demand, and this supply, usually provided by early varieties, was filled by fall varieties.

It was evident to British Columbia shippers that the Prairie demand would fall short of the usual, and outside markets were tried, especially in the Eastern States and New York City. Early shipments to these points were sold at higher prices than ruled in Canada. The British market also opened well and many good sales were made, but as the season advanced both the British and United States markets slumped, due to oversupply.

After issuing the last bulletin for the season an extended visit was made to all distributing-points where British Columbia apples were sold. Regina, Winnipeg, Minneapolis, Chicago, Toronto, Hamilton, Buffalo, and New York were visited; Saskatoon and Edmonton were taken in on the return trip. Very few apples were found in storage at any Canadian point; a few cars were inspected in Chicago and found in good condition; Toronto had a few cars stored, three of which showed "water-core" to a considerable extent, which were all of the Jonathan variety; New York and Jersey City had about 300 cars in storage, of which about 100 cars were Jonathans and Macks; a few Macks were noticed shrivelled owing to early picking and a trace of "Jonathan scald" was noticed in the Jonathans; practically all the New York offerings from British Columbia were in good condition. The trade complained of shortage in weight in the boxes, due to irregular sizing of the apples; some complained of small size and other minor matters. All jobbers interviewed, as well as the brokers, think that British Columbia apples will have a permanent place on the New York market. About 800 cars were shipped to New York from British Columbia this year and over 200 cars for Chicago and Minneapolis distribution. Western-grown apples of large size and perfect colour were exhibited for sale in all Eastern cities; it would appear by comparison with Eastern-produced apples that a permanent demand for Western apples will be confined mostly to large, well-coloured, fancy apples, excepting in years of a short Eastern crop. The Toronto District bought over 200 cars of British Columbia apples this year; the trade comments there were favourable, all agreeing that their future demand would increase.

POTATOES.

The market for British Columbia potatoes on the Prairies in 1921 was confined to early potatoes and select Interior stock; apart from these there is little chance of finding an outlet for British Columbia potatoes on the Prairies in normal years. The Prairie Provinces have increased their acreage and they are organizing to improve their grades. In November it was estimated that 1,800 cars of potatoes were held in the three Provinces for export; prices are low, with no movement, although a shortage of the general crop in Eastern Canada and the United States is known to exist. The two varieties principally grown in the Prairies are Early Ohio and Irish Cobbler, with Wee McGregor and Gold Coin being tried out. We would advise growing Netted Gems for the special Prairie trade at Interior points; this variety is popular and cannot be grown successfully on the Prairies.

Certified Seed.—The Prairie market will provide some outlet for certified seed grown in British Columbia. During 1921 this office made some inquiries to this end and expect results

will follow. The lack of shipments from a central selling agency was again responsible for irregular supply and unsatisfactory prices for early potatoes at Prairie points. We cannot see any chance to secure full market prices for early potatoes until British Columbia growers link up their local associations; considerable work was done last spring to this end and prospects point to carrying it into effect this year.

VEGETABLES.

There was no change in the vegetable market in 1921 that was different from that of 1920, excepting onions, which were a short crop with a reduced acreage; the supply was less than the demand and prices were high. Samples of sweet potatoes grown in Peachland were forwarded to Calgary and proved fully equal to imported yams; the Prairie market could take many cars of these each season.

DUMPING.

For the first time in five years fruit has been dumped on the Prairie market. Italian prunes and Bartlett pears were being cut in price; every time the British Columbia shippers reduced prices to meet Washington's cut another cut would be made until they were offered at prices far under the cost of production. Their agents stationed in Calgary were soliciting business, evidently prepared to sell under anything British Columbia could offer. During a brief visit to Vernon this matter was brought to the notice of the Executive of the British Columbia Fruit-growers' Association and the Traffic and Credit Association; a recommendation to have the dumping clause enforced was passed next day at a British Columbia Fruit-growers' Association Executive meeting in Kamloops. This act has been effective in securing a market for British Columbia pears, peaches, and apples in Canada.

PACK AND PACKING.

The need for uniform standards in packages and packing was again apparent. The box apples meeting competition with Western States should have the same definition of grades. Without exception all dealers interviewed on this matter agreed that the British Columbia box-marks should be the same as adopted in Washington and the standard lived up to. The barrel and box standards should be different, as they do not compete. The Okanagan pack has reached a point where little more can be expected from it. We noticed no improvement on it this year; their chief defects when compared with the best Washington packs were sizing and colour, which goes to show that better work is needed in selection by packers, stricter inspection in the packing-houses, and less rush on the part of piece-work packers. The Kootenay Lakes, Grand Forks, Arrow Lakes, and Creston improved their pack remarkably, leaving little, if any, between their average pack and the pack of the older organizations. One noticeable feature of all British Columbia tree-fruits was the lack of size, especially in cherries, apricots, plums, prunes, crab-apples, and peaches, which shows a need for better fertilizing and thinning in the orchards.

WEIGHT CONTENTS OF PACKAGE.

The trade is demanding a minimum weight content on packages of fruit similar to those coming from Oregon packing-houses; this is more needed in berries, plums, peaches, apricots, and cherries than in apples, although it would be welcome on all packages containing fruit. British Columbia shippers are behind their Western States competitors in filling their fruit-containers to capacity. We recommend a minimum weight standard for all fruit-packages; if this is not adopted, neither the shipper nor the consumer knows what they are getting; without a weight standard no set price can be made.

CRATES AND BOXES.

One of the things that your Markets Commissioner had his attention drawn to in New York was the well-made boxes that a California shipper packed his apples and pears in. There is evidence of rush-work in most of our packages on exhibition, and this has a bad effect at the selling end.

Another matter noticed was that many shippers did not paper the sides of their apple-boxes, and when placed alongside of those having paper they showed to a disadvantage. Attractive labels on the boxes were missing in some cases, giving a cheap appearance to the pack. We noticed some prunes sent in lugs to Winnipeg that were so small that many of them rolled out

between the slats. Many of the berry-crates were well made, the only exception being crates sent to distant points in the "knock down" and made up at shipping-point; in such cases both hallock and crate were usually lopsided.

Jam and Pulp.

As previously pointed out, the jam-manufacturers did not buy in 1921. No price was established by the growers and it is doubtful if any could have been named. The buyers named the price at 7 cents on a deferred-payment plan for jam-berries on a very limited demand. The associated organizations pulped their surplus or made it into jam. Indications point to prices being realized to surpass the price obtained from the manufacturer, and increased demand is evident for jam at time of writing, especially from Eastern United States. In April your Markets Commissioner wrote J. Forsyth Smith, Canadian Trade Commissioner, Liverpool, asking him to sound the British market for frozen pulp; many replies were received, some asking for samples. The great difficulty appears to be the want of cold storage at the British end; most of the applicants preferred unfrozen pulp. This trade is being investigated and one or more orders have been placed for our pulp. Exchange uncertainty and a firm market at home may prevent developments this year; however, the near future will bring this demand to the supplying-point. Several Eastern manufacturers have expressed themselves of the opinion that Western-grown berries are firmer and better for jam-making than Eastern-grown berries; some are now investigating the supplies available preliminary to establishing in British Columbia. The 1922 outlook for contracts for jam-making is about normal; the stock carried over from 1920 is exhausted, and it remains for the growers to decide whether they will act together and establish a price or allow the same conditions to prevail that governed last year's operations.

Advertising.

Some well-placed advertising was carried out by the British Columbia Berry-growers' Association, with the assistance of the Provincial Government; they called attention to the exceptional low prices of sugar and berries and gave advance notice of the start and duration of each berry season. Other advertising was done by the Traffic and Credit Association, assisted by the Western jobbers, which followed similar lines. A very effective advertisement was placed in moving-picture shows throughout the Prairies by the Dominion Government, showing the importance of the apple industry in Ontario; similar films, it is expected, will be available next year of the British Columbia fruit-growing industry.

The Markets Bulletin.

The first bulletin was issued on June 18th and foreshadowed the season's crop outlook. During the shipping season we featured prices prevailing on all markets supplied from British Columbia; wholesale and retail prices were quoted in the principal cities. Competitive f.o.b. shipping-point prices quoted against our prices were also given, as well as f.o.b. shipping-point prices quoted at principal British Columbia points; small organizations and individual shippers found this a guide for their quotations. The circulation is now over 3,000 weekly. The last issue was sent out on November 5th, making twenty-one bulletins for the season.

Direct-to-the-Consumer Trade.

We notice with regret that large concerns have entered this business with extremely unsatisfactory results. Cash in advance was sent by customers; many of their orders are still unfilled and much of the fruit forwarded was unfit for Prairie shipments, arriving in decayed and mouldy condition. Substituting fruit for that ordered was complained of. Some disappointed customers have filed claims at this office. The following is an extract from a letter received, showing goods ordered and how they were filled:—

"Two crates Yellow Transcendent crab-apples; these came not crab-apples, but small apples so badly decayed they would not even make jelly. One crate Greengage plum, never received. One crate blue damson plum, never received. One crate red crab-apples, never ordered; arrived in scabby condition. One crate small pickling-cucumbers; came one crate cucumbers as large as quart bottles, half-ripe and mostly rotten, absolutely a total loss."

We consider that direct-to-the-consumer trade by L.C.L., especially on a perishable fruit like berries in a season like 1921, is an injury to the good name of British Columbia. Some

measures should be taken to prevent irresponsible shippers from injuring the legitimate fruit trade, and also to protect Prairie customers against loss by uninspected consignments.

INFORMATION WANTED.

During the season of 1921 many inquiries were made at this office for information with a view to settling in British Columbia. We received a supply of literature covering the Northern and Central Interior, and with our knowledge of many districts in British Columbia we were able to give the information required, or connect inquirers with members of the Agricultural Department who could furnish information wanted. As a result many of those inquirers are now shipping produce to this market from British Columbia.

GENERAL.

At no time during the marketing season of 1921 did the Prairie market show strength; while the crops were above average, the prices for stock and grain were low. The farmer's buying power was reduced and reflected to all lines of industry. As the season wore on the depression seemed to increase.

In conclusion, we beg to acknowledge the many kindnesses received from brokers and jobbers at Prairie points in securing prices and other information, also the splendid co-operation to this end received from our correspondence staff, and last, but not least, to the painstaking and thorough way Mr. Baxter, of the Fruit Division, and his staff co-operated in every matter affecting the betterment of the fruit industry.

Respectfully submitted.

J. A. GRANT,
Markets Commissioner.

REPORT OF LIVE STOCK COMMISSIONER, VICTORIA.

W. T. MCDONALD, M.S.A.

Dr. D. Warnock, F.R.C.V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I have the honour to submit herewith the annual report for the Live Stock Branch for the year ending December 31st, 1921.

GENERAL CONDITIONS.

The live-stock industry as a whole can be described as passing through an unsettled period of depression which has been most keenly felt by producers of beef cattle and sheep. The so-called Fordney Tariff of the United States has practically cut off the markets in that country for beef and wool and created a critical situation. British markets were investigated, but did not present opportunity for immediate relief. Owing to urgent representations by Canada, a British Royal Commission was appointed to inquire into the British embargo on Canadian cattle. After full investigation this Commission recommended the removal of the embargo, but up to the present date the Imperial Government has not seen fit to carry out the recommendation. The Dominion Government is still continuing its efforts to secure the removal of the embargo, and has indicated a willingness to take action in accord with a request from the Western Canada Live Stock Union to the effect that efforts be made to secure the entrance of Canadian cattle to interior points in Great Britain for immediate slaughter. Under present regulations they must be slaughtered at the port of entry.

Range conditions have been fairly favourable during the past season, though, on the whole, the cattle were not in quite as good condition as the fall of 1920. In certain sections, and particularly in the Nicola District, locusts did a great deal of damage and in places consumed all pasture grass. They also proved to be disastrous where dry-farming was attempted.

The past summer was favourable for hay production over practically all of the hay-producing sections of the Province. While at some points the yield was not high, still the average on the whole was very satisfactory and ensures an abundant supply where normally sufficient hay is produced for local consumption. However, we encountered an early winter, and unless this is

followed by an early spring the rangemen may run short of hay, as many of them are carrying over cattle which they did not market owing to the extremely low price of beef in the fall.

During the past year a careful investigation has been made of marketing conditions in the Province. There has been considerable agitation favouring the establishing of stockyards at some Coast point, but such a move would be of doubtful value unless full co-operation of producers and buyers could be assured. One factor which militates against such a move is that there would be a very limited market for stockers and feeders at the Coast. The encouragement of home slaughtering properly done would doubtless prove of value in developing local markets.

During the war period a campaign was conducted for the purpose of conserving meats and the civilian population was urged to use meat substitutes, and often comparisons, written and illustrated, were used that had as their purpose the placing of meat among the less desirable of human foods. Often those responsible for such propaganda have failed to appreciate its far-reaching influence, and we believe the principal effect has been that of curtailing the consumption of meat. It has been estimated that the *per capita* consumption of dressed meat and lard fell from 181.5 lb. in 1900 to 154.3 lb. in 1920, and doubtless the above-mentioned factor has had some influence in bringing about this reduction.

HORSES.

The continued business depression has had a direct influence on the horse-breeding industry, but the surplus of horses that resulted from the diminished amount of lumbering and construction has been absorbed, so that with a marked improvement in general business conditions it would be difficult to meet the demand that would develop for heavy horses. Even at the present time dealers are finding difficulty in filling orders for good draught horses.

During the past year there has been evidence of an increased interest in horse-breeding and a considerable number of stallions of the draught breeds were sold within the Province. In the Chilliwack and Agassiz District a Horse-breeders' Club was organized under the Dominion plan of assistance and a Clydesdale stallion was leased for the season. We feel that our farmers in several districts might well take advantage of the Federal assistance, and with that end in view we are co-operating with R. E. Wilson, of the Horse Division of the Dominion Live Stock Branch.

Considerable interest was taken in the horse departments of our principal fall exhibitions and there were an unexpected number of entries in the light classes. While some excellent draught stallions were shown, there is need for more heavy stallions of the right sort.

An investigation of conditions reveals the fact that some firms are replacing motor-trucks with horses owing to greater economy and efficiency in certain classes of work.

Both heavy and light horses shown by British Columbia exhibitors at the recent Pacific International Live Stock Exposition held at Portland, Oregon, met with remarkable success and many first-prize ribbons were captured, as well as championship honours.

The number of horses in the Province remains about the same as for the previous year, or 44,558.

CATTLE.

As previously indicated, the producers of beef cattle have had a trying year owing to the extremely low prices that have prevailed. Notwithstanding this fact, a considerable number of pure-bred females, as well as males, of the beef breeds have been imported into the Province, most of these going to Interior points where a number of pure-bred herds are being established. There is no doubt that the past year has been an opportune time for the purchase of pure-bred beef cattle and many have so regarded it. The financial depression in the Prairie Provinces has forced many of the breeders there to dispose of portions of their herds at low prices. A considerable number of breeding females have been brought into British Columbia from the Calgary and Edmonton Stockyards.

The number of beef cattle in the Province is 159,854, as against 154,772 for the previous year.

The past year has been favourable for the development of the dairy industry owing to the comparatively high prices prevailing for dairy products. Along the line of the Grand Trunk Pacific and at points on the Pacific Great Eastern where previously beef cattle had been dominant, many dairy cattle have been introduced and two new creameries are making satisfactory progress. These districts have been particularly fortunate in being able to secure high-grade

cows from the Lower Fraser Valley, where the average production of the dairy cattle is high. Present conditions would indicate that the above-mentioned districts will absorb a large number of dairy cattle during the coming year.

The development of pure-bred herds of the dairy breeds has been making excellent progress. More and more attention is being given to records of production, and at the present time it is a difficult matter to sell a sire that is not backed up by high-producing female ancestry.

Many of our pure-bred herds are being placed under the "accredited herd" system and there are now ten fully accredited herds in the Province.

The British Columbia Holstein-breeders' Association and the British Columbia Jersey-breeders' Association are active in promoting the interests of their respective breeds. Each association has held a successful sale during the past year. Plans are now under way for organizing a Guernsey-breeders' Association and an Ayrshire-breeders' Association. Such associations accomplish much good for their respective breeds and thereby for the dairy-cattle industry as a whole.

The number of dairy cattle increased from 94,816 in 1920 to 101,518 in 1921.

SHEEP.

The year just closed has been one of low prices for wool and mutton. The Canadian Co-operative Wool-growers, Limited, faced a critical situation when the 1921 clip was ready for market; the United States market was cut off by a tariff of 15 cents per pound on fleece wool, and investigation indicated that the English market was so heavily stocked as to eliminate that channel as a means of disposing of any appreciable quantity. It therefore became necessary to develop a home market, and the association deserves much credit because of the fact that the 1921 clip will be entirely disposed of at an early date. Though the price received has been low as compared with recent years, still the association has undoubtedly proven of great service at this critical period.

The fall of the year has shown a revival of interest in sheep and many farmers have taken advantage of the low prices to purchase breeding ewes. Shortage of feed, curtailment of the range, and the financial depression combined to force the sale of thousands of sheep in Southern Alberta. Fortunately, British Columbia buyers were able to handle much of the breeding stock and at prices that should make them a very profitable investment. There is room for a great many more sheep in the Province and it is gratifying to note this renewed interest at this time.

The sheep-show at the summer and fall fairs in Western Canada was probably the largest and of the best quality in the history of these fairs.

The number of sheep has increased from 46,473 in 1920 to 51,457 in 1921.

SWINE.

There has been a marked decrease in the number of hogs in Canada, and while this decline has not been as marked in British Columbia as in certain other Provinces, yet the swine population dropped from 44,010 in 1920 to 41,522 in 1921. With the prices of feedstuffs as at present prevailing, there is a tendency to revive the hog-breeding industry, and with judicious use of pasture the raising of pigs can be conducted on a profitable basis.

Though there has been a marked decrease in the foreign imports of other meat products, there has been an increase in the importation of pork from foreign countries.

A conference was held in Ottawa on November 2nd and 3rd, 1921, for the purpose of considering ways and means of encouraging the production of a type of bacon-hogs suitable for the production of bacon for the British market. At this conference the following classification for market-hogs was adopted:—

(1.) Select bacon-hogs: Jowl and shoulder light and smooth; back from neck to tail evenly fleshed; side long, medium depth, dropping straight from back; ham full, good general finish, no excess fat. Weight, 160–210 lb.

(2.) Thick, smooth hogs: Not conforming to Wiltshire standard, but of smooth fleshing and finish. Weight, 160–210 lb.

(3.) Heavies: Any type of smooth fleshing and finish. Weight, 210–260 lb.

(4.) Extra heavies: Same as heavies, but weighing over 260 lb.

(5.) Shop-hogs: Any type of smooth conformation; finished. Weight, 120–160 lb.

(6.) Lights and feeders: Any type of smooth conformation; unfinished. Weight, 160 lb. and under.

(7.) Roughs: Of rough conformation. Any weight.

(8.) Sows: All females that have raised one or more litters. No. 1, sows of smooth finish and smooth underline up to 350 lb.; No. 2, all other sows.

(9.) Hogs that have been castrated and are well healed before being offered for sale.

The present plan calls for grading according to the above standard to begin May 1st, 1922. This grading will be supervised at stockyards by Federal Government representatives. The packers agreed to pay a minimum premium of 10 per cent. for select bacon-hogs. This is a matter which at present affects British Columbia only indirectly. We are importers of hogs (alive and dressed) and our local markets mainly demand an animal of the shop-hog type.

Goats.

The number of milch goats in the Province has now increased to approximately 6,000, showing an increase of about 1,000 over the previous year. Milch goats are becoming a factor of considerable importance in certain suburban districts and a number of breeders possess animals of high quality, both from the standpoint of breeding and of production. Importations of pure-bred breeding stock are being made from Great Britain and the United States.

Boys' and Girls' Clubs.

There is an increasing interest in Boys' and Girls' Clubs, and this particularly applies to poultry, calf, and pig clubs. During the past year three pure-bred Jersey calf clubs were organized and very successfully conducted. The members exhibited their pure-bred heifer calves at Chilliwack, Salmon Arm, and Armstrong Fairs respectively, and the quality and condition of the exhibits reflected great credit on the boys and girls. Plans are under way for the organization of several additional pure-bred calf clubs and the number of pure-bred calves available will be the only limiting factor in regard to the number of clubs formed. In the case of these clubs the local banks have financed the scheme where clubs are in existence.

The Boys' and Girls' Clubs deserve every encouragement and it is gratifying to note the growing appreciation of this work.

Pure-bred Sires.

The policy of supplying pure-bred sires to Farmers' Institutes on easy terms of payment has been continued. The Provincial Department has co-operated with the Federal Department in this matter and assisted many districts in taking advantage of the free-loan policy of the Dominion Live Stock Branch.

There are still many scrub sires in the Province and every effort is being made to encourage the use of pure-bred sires. The results of this compaign are very evident in many districts.

Dry-farming Stations.

The Quilchena Dry Farm, the last of the dry-farming stations, was closed during the past year and the stock and equipment sold. The results obtained while the station was operated have furnished the Department with valuable information regarding the district.

Brands.

During the year 232 horse-brands and 365 cattle-brands were allotted and 189 horse-brands and 266 cattle-brands were renewed. Thirty-two hide licences were issued.

A brand-book containing all horse and cattle brands of good standing at the end of 1920 was published and placed on sale at the cost price of $1.

Fairs.

The live-stock exhibits, particularly in the cattle, sheep, and swine departments, were very satisfactory and the sheep-show was an outstanding feature at the large exhibitions. The dairy-cattle exhibits were excellent at the shows held in the dairy districts, while at Vancouver, New Westminster, and Victoria all four dairy breeds were well represented. Your Live Stock Commissioner acted as one of the judges at Vancouver and at New Westminster and as superintendent of the horse department at Victoria. Unfortunately, most of the other fairs were held on dates conflicting with the larger exhibitions, which permitted attendance at only a few of them.

BRITISH COLUMBIA STOCK-BREEDERS' ASSOCIATION.

The question of live-stock marketing has received a good deal of attention from the British Columbia Stock-breeders' Association during the year just closed and efforts will still be made with a view to improving conditions, especially in the marketing of beef cattle. Owing to local conditions the problem is one not easy of solution; one difficulty being that the market for killing cattle is largely at the Coast and the market for stockers in the Interior, thus complicating matters in so far as stockyards may be considered a remedy.

A successful convention was held in Victoria on February 10th and 11th, 1921. The third annual bull sale and show was held at Kamloops on March 22nd and 23rd, 1921. Ninety-seven head were sold for $19,687.50, which was considered very satisfactory under existing conditions. The highest price paid in all similar sales held in Western Canada during the past year was $1,250, paid at Kamloops for the Shorthorn bull "Clear the Way." In addition to the judging of the regular show classes, stock-judging demonstrations are held in connection with the bull-sale, making the event as strongly educational as possible.

I am submitting herewith the annual reports of George C. Hay, District Agriculturist, Kamloops, and of J. R. Terry, Chief Poultry Instructor.

Respectfully submitted.

W. T. McDONALD,
Live Stock Commissioner.

REPORT OF CHIEF VETERINARY INSPECTOR, VICTORIA.

DR. A. KNIGHT, V.S.

Dr. D. Warnock, F.R.C.V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I beg to submit the report of the Veterinary staff for the year from January 1st to December 31st, 1921.

I am pleased to report at the outset that outside of dealing with tuberculosis we have had very little trouble with the stock throughout the Province from a health standpoint.

A number of cases of disease among live stock have been reported, but upon investigation nothing of a serious nature was found. During the year, however, we have had to deal with several cases of influenza among horses, but these were confined to a small area in the vicinity of Williams Lake. The outbreak was not as serious as one would anticipate by the report sent in, as apparently only a few horses were affected and no loss occurred.

INTERNAL PARASITES AMONG SHEEP AND CATTLE.

There have been some losses among sheep affected with liver-fluke (*Distomum hepaticum*). These losses, however, have occurred on premises where sheep have been pastured for a number of years on land subject to overflow, which makes it a favourable ground for the propagation of flukes.

When discussing this matter the owners have been advised upon different occasions to either drain the land or put it under crop for a few years. Also they have been advised to supply lime to infected ground, but I believe little, if any, remedial measures have been taken and as a consequence a number of losses have occurred.

In talking to a number of butchers who handle beef cattle, which also covers the same ground, I have been informed that in almost every animal slaughtered the liver has been found infested with flukes, but apparently not to such an extent as to have any serious effect on the market value of the animal.

PLANT-POISONING.

Cases of plant-poisoning have been reported to the Department, more particularly during the early spring and summer months. As in previous years, the losses occurring from this cause have been reported more especially from Central British Columbia, where apparently water-hemlock is prevalent. This plant appears to be quite widely spread throughout Central British

Columbia, and under the conditions which animals are kept, no doubt losses will occur from year to year. Owing to the nature and range conditions of the country it will be almost impossible for years to come to prevent losses from water-hemlock.

Larkspur, although somewhat prevalent, is causing very little trouble to stock-owners. Only in one case have I heard where a few animals were lost due to eating an excessive amount of this plant, and in this case the animals were apparently without food for some little time, and being turned loose where larkspur was prevalent, no doubt the animals engorged themselves, with the result that a few fatalities occurred.

Mange.

Dr. Ilsley reports that a few cases of mange were reported to him; on investigation, however, he found they were simple cases of ringworm.

Actinomycosis.

Cases of this disease were reported from the Cariboo District, of which a number occurred among range cattle. The advanced cases were collected and destroyed by the owners. In a number of cases in the early stages the owners treated this disease with potassium iodide with fair success, the animals being subsequently turned loose.

Infectious Abortion.

This appears to be more or less widely spread in the northern section of the Cariboo District, more particularly among the ranges adjacent to the Fraser River, south of Quesnel. No attempt has been made to deal with this question outside of advising the owners to take precautionary measures towards keeping animals showing evidence of the disease isolated.

Sanitation of Stables and Dairies.

The grading of dairies and stables as reported by your Inspectors shows a greater number listed under Grades A and B. This would indicate an improvement in the general sanitary conditions affecting our milk-supply. I also know that a greater number of stables are graded higher throughout our country districts than those found within the confines of our cities. In their method of handling dairy products we find a greater care is usually taken by farmers than parties keeping cows within the city. Where the stables are in an unsanitary condition the owners are instructed by your Inspectors wherein to remedy matters.

If it were possible to follow up these unsanitary premises by regular inspection every few months I am satisfied that much improvement could be made, but with our present limited staff attempting to cover such wide areas as our work calls for it is impossible to repeat our visits to these unsanitary premises as often as we would like.

We also find in a number of cases that milk is not properly cooled immediately after milking. Such milk does not arrive at its destination in a very good condition, especially during hot weather. Over this matter, however, it is impossible to keep daily supervision. If milk was paid for according to grade, no doubt it would have a salutary effect upon the negligent milk-producers.

Tuberculosis.

As in previous years, the time of the Veterinary staff has been devoted largely to tuberculin-testing of dairy cattle throughout the Province. The cities of the Province are requesting certificates from all dairymen to the effect that their herds have been tested. For this reason the work of the staff has been spread over large areas in order to comply with the requests of the cities and also requests by farmers. With the idea of attempting to provide each dairyman with a certificate as per requests, so as not to prevent him selling milk, we have been unable to repeat our tuberculin tests in infected herds as often as we would like.

To make our work more effective in the elimination of tuberculosis it is absolutely necessary that infected herds should be retested at least every three months, until we are satisfied that no tuberculosis exists in such herds. With our limited staff and money set aside for compensation we have been unable to repeat our tests as often as we deem it necessary.

During the year we have visited 2,737 premises, tested 17,706 cattle, finding 997 reactors. Considerable time has been devoted to the testing of cows within the boundaries of Vancouver, Burnaby, New Westminster, Victoria, Nanaimo, and Prince George. The great majority of these

cows are kept by private parties on lots. To find these cows and make the test entails considerable time, without showing a corresponding number of cows tested for the time devoted to this work. For instance, within the combined boundaries of Vancouver, Point Grey, South Vancouver, North Vancouver, and Burnaby there have been 1,104 cows tested. In our tuberculosis-work I find that the greatest percentage of reactors is found in those herds adjacent to the cities. This feature is quite marked in several instances as shown by the work covered this year.

A list of the districts in which herds were tested will be found in Appendix No. 18.

Respectfully submitted.

A. KNIGHT,
Chief Veterinary Inspector.

REPORT OF CHIEF SOIL AND CROP INSTRUCTOR, VICTORIA.

W. NEWTON, B.S.A., M.S.

Dr. D. Warnock, F.R.C.V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I beg to submit herewith the annual report of the Soil and Crop Division.

GENERAL CONDITIONS.

The fall in the price of agricultural products during the year ending December 31st, 1921, has increased the interest on the part of the farmers of British Columbia in soil-management and crop-management problems. This interest has been very apparent to the officials of the Soil and Crop Division. Inquiries have been received from all parts of the Province for assistance in outlining how crops can be more economically produced. The productivity of the soil is such an important factor in producing crops at a profit that particular attention has been paid by this Division to problems relating to soil fertility and management.

The interest awakened throughout the Province in the improvement of the potato industry as a specialized phase of the activities of this Division has already been recognized as economically sound. The report of C. Tice covers this work.

SOIL INVESTIGATIONS.

Investigations in relation to the character of the soils in different parts of the Province have been continued. Up to the present these investigations have been of a general nature, the results of which have been presented in separate reports and to public meetings in the districts where the investigations have been made. Part of these investigations are covered in the report of the soil and crop surveys appended.

Sufficient data and field experience have now been secured to outline a more definite system for classifying soils. This system is now being prepared and copies will be forwarded to all officials of the Department of Agriculture who are likely to be called upon to describe the soils in the districts they cover. The object of so doing is to secure definite information in relation to soils that will enable the Department of Agriculture to deal more accurately with problems of soil-fertility and crop-management.

The continuance of the arrangement with the Department of Mines is reported, whereby the chemical analysis of soil samples are undertaken upon the approval of this Division. The indiscriminate forwarding of samples for analysis has been discouraged, for there are so many factors that may account for low yields, apart from the chemical composition of the soil, that we consider a chemical analysis alone as valueless. In order to deal with samples of soil forwarded to the Soil and Crop Division for examination a special report on field conditions must be submitted. The forms may be secured upon application. Upon the receipt of the field report a physical analysis of the sample is made, and when a chemical analysis is considered to be of value arrangements are made to have the work done.

DRAINAGE.

Underdrainage as a means to prevent the spread of alkali in the Interior irrigated districts has continued to be a policy of the Division. Assistance has been granted in outlining drainage systems for this purpose.

In the Lower Fraser Valley and Island Districts the farmers have awakened to the value of underdrainage as a means of increasing crop yields. It has been in these districts that the bulk of the assistance in drainage problems has been granted. The procedure has been as follows: On receiving an application for assistance a general survey of the area is made to ascertain the probable value and type of drainage system most suitable for the area in question. If underdrains are deemed advisable, levels are taken over the area and the nature of the soil is determined. From such information it is possible to determine accurately the system of underdrains most suitable to the area, including the depth the tile, rock, or wood drains should be placed, the size of the tile that will effectively carry off the water, and the distance apart the drains should be placed. Many farmers who desire to install drains have not had previous experience in drainage operations. Furthermore, they do not possess the accurate instruments that are necessary for taking levels. The assistance given by this Department is consequently appreciated.

RECLAMATION BY DRAINAGE.

Several areas in the Lower Fraser Valley and on Vancouver Island were surveyed during the past year with the view of determining the economic feasibility of their reclamation. Special reports were given to the parties interested on these areas.

SEED-IMPROVEMENT.

To encourage the use and production of better seed a Provincial Seed Fair was held by this Division in Victoria. Exhibits were received from all parts of the Province. Addresses and discussions were arranged for that were of interest to the producer as well as the purchaser of seed. Special attention was given to the adaptability of many Interior sections to the production of alfalfa-seed. The growing of flower-seeds, particularly sweet peas, on Vancouver Island was brought to the attention of the farmers present.

Arrangements are now being made to keep in closer touch with the alfalfa-seed growers than has taken place in the past. Inspection forms have been compiled that will enable the Division to keep on record notes as to the field conditions of the principal alfalfa-seed areas of the Province next year.

The necessity of securing the highest-quality stock seed and that special attention be paid in maintaining the purity of such stock seed by careful "roguing" has been advocated by this Division as the means of building up the flower-seed production industry of Vancouver and adjacent Islands. The industry is comparatively new. That high-quality flower-seed, particularly sweet peas, can be produced has been clearly proven. The future of the flower-seed industry depends upon the demand for British Columbia grown seed on the English market. It is at this time, when the industry is in its infancy, that it is possible to build a reputation with the English seed-houses.

SILO-DEMONSTRATION WORK.

Several silos were erected during the past year under the supervision of this Division. This work has been greatly curtailed during the past year, partly due to the resignation of the Silo Demonstrator, and partly to the fact that there is now less call for demonstration-work of this sort. In order to encourage a more general use of the silo the original policy of the Department was to assist in the erection of a demonstration silo in every district of the Province. When once the value of the silo has been clearly demonstrated by a number in active use in any district further demonstration-work is not required. Except in a few of the newer districts where assistance in the actual construction and filling of the silo would serve to introduce the silo, the future work of this Division will be in the nature of supplying the farmers with information relating to construction of silos and the most suitable silo crops for the particular district from which the application for information is received. The work of this Division during the past year has largely been of this character.

The continuance of the policy of loaning forms for the erection of concrete silos is reported.

JUDGING AT FALL FAIRS.

The principal fairs held on the Lower Mainland and on Vancouver Island were attended. Although present in the capacity of a judge, the opportunity was taken to discuss with the farmers in attendance the relative merits of the exhibits present in relation to their farming operations. These discussions were principally confined to forage-crops.

LECTURES.

Lectures relating to the management of soils and the production of crops were given throughout the Province. When it can be arranged the policy of the Division is to spend sufficient time in the district to become familiar with the important local problems before a lecture is given.

PERSONAL CONTACT.

Whenever possible the farmers' problems are discussed in the field rather than on the platform. The personal-contact factor is an important one, particularly in giving instruction in soil-management, owing to the variable soil conditions of the Province of British Columbia.

CORRESPONDENCE.

We again desire to emphasize to any one desiring information through correspondence to clearly define the location of the farm to be dealt with. This particularly applies to information regarding soil-management or the adaptability of specific crops. In order to deal accurately with problems through correspondence the Division is gathering and classifying local information in regard to soils and climatic conditions. The amount and nature of the correspondence during the past year suggests that the farmers throughout the Province appreciate our efforts in this regard.

PUBLICATIONS.

Timely articles were published in relation to soil and crop management in the *Agricultural Journal*. Bulletin No. 87 was published dealing with the value and use of fertilizers.

Appended are reports on soil and crop surveys.

Respectfully submitted.

W. NEWTON,
Chief Soil and Crop Instructor.

REPORT OF SOIL AND CROP INSTRUCTOR, VICTORIA.

C. TICE, B.S.A.

Dr. D. Warnock, F.R.C.V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—The need for improvement of the potato industry in this Province being so necessary, your Soil and Crop Instructor has devoted the greater part of his time during the past year to activities along this line.

The system of seed-potato inspection and certification which was outlined in 1920 was put into effect this year.

To improve the potato industry in this Province it was realized that three factors were essential—namely, that of better seed, standardization of varieties, and organization of the growers. The system of seed-potato certification which has been adopted in this Province involves all of these factors.

SEED-POTATO CERTIFICATION.

Preliminary Work.—Interest in this work was first aroused by a series of articles which appeared in the *Agricultural Journal* and other papers, and also by the publication of a pamphlet on seed-potato certification.

During the winter months meetings were held in those districts where the growers showed enthusiasm and desire for taking up this new work, due consideration necessarily having to be given to the suitability of the district. Several districts which applied for inspection of their crops had to be rejected, both on account of their location and also because the funds available

were not sufficiently large to give the necessary assistance. However, it is hoped, with the extra assistance which is available next year, that it will be possible to carry on the work in all those districts which make application for inspection, provided the district is considered suitable.

Wherever possible local organizations have been formed, because it is realized that co-operative effort is necessary in undertaking work of this nature.

Each district taking up the seed-certification work has to select one or a limited number of varieties as standard for that particular district. No other varieties but the ones selected may be entered for seed-certification purposes. By this means it will be possible to bring about the standardization of varieties in the various districts.

Foundation Stock.—As there was no certified seed available in this Province, there were two courses for the growers to pursue in the obtaining of good foundation stock: First, to import certified seed, or, secondly, to use the best local stock. The Ellison District imported a car-load of certified seed from Minnesota and excellent results have been obtained. The crops were more vigorous and freer from disease, which resulted in increased yields.

All other districts used the best local seed obtainable. The results secured were not as good as they would have been had certified seed been used. However, they were satisfactory.

Method of carrying on Work.—Two inspections of the growing crop are made and two after harvest. The first field inspection is made at bloom-time, since this is the best time to detect impurities and certain diseases, such as leaf-roll and mosaic. The second field inspection is made just prior to maturity to ascertain whether the crop has been rogued, and this is also the best time to detect such diseases as wilt and rhizoctonia. The first tuber inspection is made before grading and the second just prior to shipping.

Certain standards have been set for a crop to measure up to at each inspection. Those growers whose crops pass all inspections are entitled to sell their seed as "certified." Suitable tags are issued for this purpose and are attached and sealed to each sack by the Inspector at shipping-time.

Additional Assistance.—Work of this nature which necessitates the carrying-on of several inspections, and these to be made at a certain fixed time, requires much additional assistance. This year G. S. Coward, a recent graduate of the British Columbia University, was appointed to assist in this work.

Co-operation of other Officials.—The co-operation of J. W. Eastham, Plant Pathologist, has always been very acceptable not only in assisting to draw up the standards which have been adopted, but also in making the inspection of crops in various districts.

The co-operation of the Agronomy Department of the University, the various Dominion Experimental Farms throughout the Province, and other departmental officials has been gratefully received.

Extent and Progress.—During the past year eighty-nine growers, covering nine districts, had their crops inspected. The total number of acres inspected was 195, the number of acres passing the first field inspection was 175, and 157 passed the second field inspection. At the time of preparing this report the final tuber inspection has not been made. However, it is estimated that about 5,000 sacks of seed will be offered for sale by the growers. (*See* Appendix No. 19 for results of inspection.)

Attitude of Growers.—Growers in all parts of the Province are beginning to realize the necessity for planting better seed, for organization, and the standardization of varieties. Applications for inspection are coming in from all parts of the Province, as also are applications for good seed. Districts which thought they had little or no disease are beginning to realize that most of the important diseases do exist and that immediate control methods must be applied.

Pacific North-west Potato-growers' Conference.—It was the privilege of your Instructor to attend the Pacific North-west Potato-growers' Conference held in Spokane, Washington, in December of this year. Experts were present from various parts of the United States to discuss and impart the latest information in connection with the potato industry.

One evening session was devoted to a discussion of seed-certification standards.

Of the speakers, the most notable were Dr. Wm. Stuart, Potato Expert, Washington, D.C., and Dr. G. K. K. Link, of the Bureau of Plant Industry.

Fairs and Potato Exhibits.

The assistance rendered by this official in the way of acting as judge at the fairs was much less than in the previous year, the reasons being that the increased work in connection with

potato inspection and certification required his attention, also because an educational potato exhibit was staged by this Division at the three large fairs. The potato exhibit included a display of the varieties recommended for the Province, the kind of seed to plant, samples of certified and uncertified seed, and specimens of diseases with methods of control. Much interest was shown in this exhibit by those who attended the fair.

Publications and Charts.

A bulletin entitled the "Potato in British Columbia" was issued during the year, also a pamphlet on "Seed-potato Certification." Articles on various topics were written for the *Agricultural Journal* and a chart on potato varieties prepared. A chart on potato-diseases is now being prepared by this official, with the co-operation of J. W. Eastham, Plant Pathologist, for distribution throughout the Province.

Meetings attended.

Many meetings were attended during the past year and lectures given in various parts of the Province. For this purpose your Instructor has now prepared a set of slides which cover nearly all phases of the potato industry.

Potato-crop Competitions.

This official again acted as judge in local potato-crop competitions held in Malakwa and Errington. The value of these competitions in these two districts is being appreciated more each year by the farmers.

All of which is respectfully submitted.

C. Tice,
Soil and Crop Instructor.

REPORT OF DISTRICT AGRICULTURIST, KAMLOOPS.

Geo. C. Hay, B.S.A.

W. T. McDonald, M.S.A.,
Live Stock Commissioner, Department of Agriculture, Victoria, B.C.

Sir,—I beg to submit my annual report for the year 1921.

Canadian Co-operative Wool-growers, Limited.

It is well within the truth to state that the Canadian Co-operative Wool-growers, Limited, has during its very brief existence almost revolutionized wool grading and marketing in Canada, and has succeeded in developing a home market for raw wool in our own country by a persistent and highly intelligent sales and propaganda policy. It has virtually proven the salvation of the flockmasters in handling the last two seasons' clips against world conditions, which were not far removed from entire demoralization. It is gratifying to note that the entire Canadian clip is gradually finding its way into the capable hands of this organization, which deserves the support and patronage of every sheep-owner in Canada.

Canada has been the chief market for Canadian wools the past season, and it is worthy of note that 1921 sales to the Canadian trade far exceed those of 1920. This growing trade and the increase in the use of Canadian wools by the Canadian mills is a most encouraging feature of the work which has been done on Canadian wool in the past few years. Better sheep, better methods of preparing wool for market, better grading of the wool, and the sale and featuring of Canadian wool by the growers' own organization are responsible for the improvement.

The organization is a purely co-operative one, working in an endeavour to improve the Canadian wool-clip, thereby encouraging the sheep industry in Canada, and of course the monetary returns to the growers themselves as a result. It comprises and is affiliated with practically all the sheep-breeders' and wool-growers' associations in Canada. It handles the wool-clip of some 12,000 growers, or about 5,000,000 lb. annually. This amount is approximately one-third of the spring wool-clip in Canada, or about one-half of the clip which reaches the open market,

since much wool in recent years has been made up on the farm. Of the 5,000,000 lb. handled by this organization in 1920, some 45 per cent. was placed with the Canadian trade, 50 per cent. with the American trade, and 5 per cent. with the English trade. From this it will be noted that some 55 per cent. of the wool was exported, and it is possible that some of the wool which was sold to the Canadian customers was also exported. The season of 1921 presented an absolutely different situation. The emergency tariff of 15 cents per pound on fleece-wools entering the United States has made it absolutely prohibitive to market our wool in that country. The English market has been very heavily stocked with wools carried over principally by the British Government. Consequently the market for the 1921 Canadian wool-clip has had to be found in the Canadian mills, and sales have been more or less slow and in small quantities to supply their immediate needs.

British Columbia Wool-growers' Association.

As a director of the British Columbia Wool-growers' Association your Agriculturist has tried to advance the interests of sheepmen, and particularly by marketing their wool through this association.

British Columbia wool was collected at Kamloops from all parts of the Province, and car-loads made up and forwarded to the central warehouse of the Canadian Co-operative Wool-growers, Limited, at Toronto, and this organization on receipt of same graded and offered the wool for sale. Some 100,786 lb. of wool was shipped from this Province, which we are sorry to state is a decrease of 75,000 lb. as compared with last year's shipments. The cause of these decreased shipments is accounted for as follows: First, statistics of the sheep population of the Province show a decrease of 6,000 lb., which would represent approximately 45,000 lb. Secondly, quite a large amount of the 1921 wool-clip did not come on the market and is still retained on the farms owing to the demoralization of the market and prevailing high freight rates. Furthermore, a small percentage of the clip was consumed by the Canada Western Woollen Mills in Vancouver.

Shipments were received from all parts of the Province, and more and more are the sheepmen regarding the organization as their chief selling agency, as well as their medium for purchasing supplies.

Kamloops Bull-sale.

As Secretary of the 1921 Kamloops Bull-sale your Agriculturist has had considerable to do in this connection throughout the year. The sale on the whole was most successful and it is well within the truth to state it was the leading sale in Western Canada last year. The following statistics will substantiate this statement:—

Averages at Western Sales, 1921.

Place.	No.	Shorthorn.	No.	Hereford.	No.	Angus.
Regina	46	$203 15	40	$218 50	9	$170 63
Brandon	...	237 50	...	215 00	...	208 00
Calgary	38	221 00	4	187 50	...	.....
Edmonton	190	200 40	196	137 27	63	108 43
Prince Albert	119	174 93	16	198 43	30	138 50
Kamloops	21	211 00	...	.....	4	140 00

Top Price at each Sale, 1921.—Kamloops, $1,250; Edmonton, $900; Calgary, $850; Regina, $725; Brandon, $510; Prince Albert, $425. (For a detailed statement of the sale *see* Appendix No. 20.)

British Columbia Shorthorn-breeders' Association.

The British Columbia Shorthorn-breeders' Association has been fairly active during the past year, considering this was their first year of organization-work. There are now thirty-one members in good standing and a much keener interest taken in the furthering of the breed interests in the Province. Besides the usual secretarial work, your District Agriculturist as Secretary has had much to do with straightening out and keeping in order registration papers for the various members.

BRITISH COLUMBIA HEREFORD-BREEDERS' ASSOCIATION.

This association can also report progress, and again your Agriculturist has taken care of the secretarial work.

INSTITUTE MEETINGS.

During the past year various institute meetings were arranged and on many different occasions addresses were given on agricultural topics. Wool-growers' meetings, breed association meetings, and boys' and girls' meetings were arranged for and conducted by your Agriculturist.

FALL FAIRS.

The fairs visited during the past year were Vancouver, New Westminster, Victoria, Forest Grove, and Invermere. At each of these fairs, with the exception of Vancouver, your Agriculturist officiated as judge.

STOCK-JUDGING DEMONSTRATIONS.

On different occasions throughout the season stock-judging demonstrations and competitions were held, and later on a judging team was taken to the Coast fairs which was successful in gaining first honours at the three exhibitions. The result of this work has created a keen interest on the part of all concerned, and particularly the younger class, who are looking forward to associating themselves with the work during the coming season.

LAND SETTLEMENT BOARD.

Throughout the summer your Agriculturist acted as agent for the Land Settlement Board in this district and made quite a number of appraisals and reports on loans, all of which took considerable time and extra travelling in connection with same.

QUILCHENA DRY FARM.

Operations at the Quilchena Dry Farm were conducted as in previous years until the end of September, when the station was closed down. Nothing special was conducted during the past year, as we were advised at the early part of the season to discontinue operations as soon as possible. The nature of the work therefore consisted of growing a crop and harvesting it, and at the same time disposing of stock and equipment whenever the occasion arose until everything was finally closed up at the end of September.

KAMLOOPS DISTRICT CREAMERY.

In response to the continued requests of the Board of Directors of the Kamloops District Creamery Association your Agriculturist has undertaken the work of general manager of this organization. It has involved a decided increase in the office-work and much personal attention has had to be given to the creamery daily.

OFFICE.

The above lines of work, together with frequent inquiries for information at the office, has kept your Agriculturist especially busy during the past year. Every effort is made at all times to assist the farmers in every way possible, and the steady increase in correspondence, as well as the number of visitors, is encouraging, and tends to show that the efforts on the part of the Department of Agriculture to further the work in this district is more and more appreciated.

Respectfully submitted.

GEO. C. HAY,
District Agriculturist.

REPORT OF CHIEF POULTRY INSTRUCTOR, VICTORIA.

J. R. Terry.

W. T. McDonald, M.S.A.,
Live Stock Commissioner, Department of Agriculture, Victoria, B.C.

Sir,—I have the honour to submit herewith report for the year 1921.

General Conditions.

Considering the dull times and consequent drop in prices for all kinds of market produce, poultry products of all kinds fetched fairly satisfactory prices. An increase in chicks hatched is to be recorded, averaging about 10 per cent. over the previous year.

In the majority of cases where this branch of ranching did not prove as remunerative as was expected during the year, lack of capital and experience can be rightly blamed.

During the year several large commercial chick-hatcheries were instituted at the Coast. One concern, with a branch at Seattle, hatched several hundred thousand chicks and found no difficulty in disposing of same. The Division is especially drawing the attention of the new settlers in the northern parts of the Province to the fact that day-old chicks can now be brought in much earlier than they can be hatched there, thus giving early chicks a chance to mature before cold weather sets in.

Prices of Eggs.

Following is a comparison of prices (wholesale) from 1905–21, inclusive:—

	Cents.		Cents.
1905*.....	24½	1914.....	35
1906.....	29½	1915.....	32½
1907.....	31	1916.....	34
1908.....	31½	1917.....	41
1909.....	33¾	1918.....	50
1910.....	34¼	1919.....	60¼
1911.....	34¾	1920.....	57½
1912.....	41	1921.....	39½
1913.....	35		

Co-operative Marketing of Eggs.

The Poultrymen's Co-operative Organization has during the year made great strides and now has a branch on Vancouver Island. Eggs were shipped by this organization to New York and other Eastern markets at a good profit. Eastern and Prairie markets are also being profitably tapped. With lower prices for eggs, it has been found that the co-operative organizations have attained much higher membership and consequently more strength.

Importations.

During the year the main source of eggs arriving in the Province has been from the United States and Eastern Provinces. We have to report a further decline in importations from other Provinces in the Dominion. Demonstrating the decrease in these importations during the past few years, the figures show that in 1919 we imported from other Provinces 1,041,202 dozen eggs and last year only 306,210 dozen eggs, making a drop of nearly 750,000 dozen in two years. To offset this, foreign importations increased from 1,073,567 to 1,161,403 dozen, being an increase of nearly 88,000 dozen, but a decrease in importations from all points of 118,294 dozen.

Weather Conditions.

The winter of 1920–21 was one of the mildest on record, and as a result a heavier yield of eggs was received during the winter months. More trouble affecting the organs of production has to be recorded. Very heavy losses were experienced in some sections where production was increased by artificial lighting. In some cases the mortality exceeded 15 per cent. of the flock during March, April, and May alone. In the cases investigated it was found that the immediate

* Figures supplied by ranchers from 1905 to 1911. From 1912 onwards the prices are those received for contest eggs.

cause of death was ovarian trouble brought on by overstimulation, lack of exercise, and insufficient green food. In many cases, owing to the mild spring-like weather in December and January, flocks of the light varieties, such as Leghorns, were producing nearly as many eggs daily without artificial light as those that were so treated. It would appear that the use of artificial light will prove more beneficial during severe winters than mild ones. Quite a few of those who have been using lights for the past three or four years are now lessening the light period per day. In many cases the birds are allowed to go to roost at the ordinary time and the lights are switched on for about half an hour from 8 to 8.30 p.m. During this period the birds are given a full feed of whole grain in troughs. This has been termed a "late lunch." Good returns have been received from this method of lighting.

BREEDING OPERATIONS.

A very satisfactory increase is to be recorded in the number of breeders pedigreeing their fowls by means of trap-nest work. The number of blank record forms given out by the Department during the year trebled those of the previous year. Quite a number of those who trap-nest make use of the traps only during the period of minimum production—October, November, and December—and in August and September. By so doing the breeders obtain an idea of their best early winter and winter layers. This work entails much labour and also means that a man usually handling 1,000 unrecorded birds can keep only about half this quantity when recording is practised. The Dominion Government Record of Performance work is gaining great headway not only here, but in all Provinces. Provincial breeders were successful in Egg-laying Contests in Connecticut, Ottawa, and Washington State during the year. Several breeders sent fowls to Chicago, Buffalo, New York, Toronto, and Guelph Shows. Their handsome winnings enabled them to make many sales of stock and eggs at highly remunerative prices.

During the poultry-shows in November and December a scheme was discussed for engaging one or more railroad-cars to be fitted up so as to accommodate a large number of fancy and utility fowls of the highest quality. It is proposed to send at least one or two experienced exhibitors with the car throughout the Prairie and Eastern Provinces, and, if possible, to finish up with the biggest shows in Eastern America, such as Buffalo, Chicago, and New York. A Vancouver exhibitor who has been showing at the largest shows in the East during the past three years claims that the American shows offer very remunerative prizes and good prices were willingly paid him for stock and eggs.

DEPARTMENTAL WORK.

This year an additional Instructor has been secured and located in the Interior. This move has filled a long-felt want.

Three Instructors are now visiting ranchers in all parts of the Province. One of the Instructors is located at New Westminster and covers the territory from Hope westwards. The other is located at Grand Forks and covers the territory from Kamloops west. On the Mainland the poultry-breeders are now being visited regularly and meetings of the local Poultry Associations attended quite frequently. Very valuable work is being done, in addition to the routine work, in encouraging Boys' and Girls' Poultry Clubs. Valuable work is being done in selecting breeding stock and checking outbreaks of disease.

Now that additional Instructors have been appointed the writer has found it possible to do more field-work in various parts of the Province, and particularly on Vancouver Island and Gulf Islands. Visits were also made along the Grand Trunk Pacific as far as east of Prince George and up the North Thompson River.

Lectures and demonstrations are held at centres wherever requested by United Farmers, Farmers' and Women's Institutes, Poultry Associations, and allied organizations. The Division put on displays and fulfilled judging engagements at fall fairs, etc. It is interesting to note that this Province is the only section of Canada really catering to commercial poultry-breeders by giving generous classes and prizes at every show.

PROVINCIAL POULTRY ASSOCIATION.

Twelve poultry-shows were held in the Province and were assisted by the usual departmental grant, according to the importance of each show. The last show of the season was the Provincial Poultry-show held in Vancouver. The exhibits were numerically less than last year, being just

about 3,000. The display of incubators and poultry appliances was the largest ever held. The feed-supply houses also had a few very complete exhibits of foodstuffs; showing the growing importance of the poultry industry, it is interesting to note that three of the largest companies in the Province have now engaged poultry experts to assist poultry-breeders, whilst also increasing the sale of their merchandise.

During the year the local associations increased in number by four, bringing the total up to thirty-four local associations affiliated with the Provincial. The new associations are those of Abbotsford, Port Kells, Rossland, and Revelstoke. The Provincial Association again distributed egg-record journals to its members and also published a Breeders' Directory. The edition of 2,000 copies was exhausted early in the fall and a previous directory of which we had a surplus had to be used. Breeders operating commercial hatcheries report increased trade outside of the Province. Most of the orders for chicks come from Alberta and Saskatchewan.

Annual Poultry Convention.

During August the American and Canadian Poultry Association held its annual convention in Seattle and was attended by breeders from practically all parts of the world. In addition to the American and Canadian breeders, visitors were present from New Zealand, South Australia, Great Britain, and Sweden. The poultry-breeders from this Province are to be congratulated on the fact that they were the second largest delegation at the convention. In addition to lectures from some of the best-known poultrymen in the world, visits were made to possibly the largest commercial poultry-farm in the world at Hollywood, where 10,000 birds are being trap-nested; also to the Alderwood Manor Estate, where apparently at least one land-development company is making good. Twenty thousand acres of logged-off land has been laid out for poultry-farms and fruit. Sufficient settlers have located there to make it worth while for the company to put up a $30,000 high school in addition to a demonstration poultry-farm, at which possibly 6,000 birds are kept, which is being operated by the company.

After the convention many of the American visitors made a trip to Victoria and Vancouver. Among the distinguished visitors were H. Lamon, Chief Poultry Husbandman of the United States, Washington, D.C., and T. Riggs, President of the American Poultry Association, of Chicago, Ill. The former gentleman admitted that until visiting the Dominion Experimental Farm at Sidney he had regarded the egg yields of the Pacific Coast, as related at Seattle, as fairy tales. In all, about thirty visitors were entertained after the convention.

Egg-laying Contest.

The Tenth Egg-laying Contest was concluded in Victoria on September 21st, 1921, after having run for eleven months. The competition this year was held along what is believed to be original lines. Owing to the development of the Dominion Government Egg-laying Contests it was thought wiser to change to what is known as the twin-bird contest. Two birds are sent by each competitor and one of the birds is placed in a pen with a bird belonging to another contestant. The birds are so housed that in each pen there is one bird from Class 1 and one from Class 2. As the birds in each pen lay one brown egg and one white egg, this plan obviates the use of trap-nests and is an adaptation of the single-bird contests held for years in Australia. In addition to the two birds entered, each contestant sends a spare bird which is placed in a house according to its class and a trap-nest record is kept of each bird. This form of contest works very satisfactorily and is appreciated by the contestants, as instead of sending six birds they had only to send half that number.

During the year inquiries were received from two Western States as to the working details of our contest, as they are thinking of running similar contests in their States.

A grand total of 13,405 marketable eggs were laid by the 80 birds competing, being an average of 167.5 eggs per bird. In Class 1 (40 birds) 15 birds each laid over 200 eggs apiece during the eleven months. The highest layer in this class produced 235 eggs and the poorest layer 63 eggs. In Class 2 (40 birds) 7 birds each laid over 200 eggs apiece during the eleven months; the best layer produced 239 eggs and the poorest layer 31 eggs, while one bird went through the eleven months without laying a single egg.

Four pens were disqualified for laying eggs less than 24 oz. to the dozen, average weight. The Department awarded the usual cash prizes, and in addition the Provincial Poultry Association awarded cash prizes, monthly diplomas, and monthly bronze medals to the highest layers in each class. A report of the contest, together with further details, is attached.

BOYS' AND GIRLS' CLUBS.

The Department again carried on these competitions. Clubs were formed at Kamloops, Vancouver, Courtenay, Royston, Comox, Grantham, South Vancouver, Sandwick, and Merville, a total of fourteen clubs. One instructive feature in connection with the judging of the clubs is that certain parts of the Province, owing to altitude and climatic conditions, can apparently mature chicks much faster than others. For instance, the Kamloops District, starting a month later than the Coast District, can develop chicks fast enough to average as great maturity as those on the Coast by September 1st. After this date the milder conditions of the Coast operate in favour of the chicks and ordinarily they commence to lay sooner at the Coast. Many children now sell breeding stock at exceedingly remunerative prices to ranchers and others.

The Comox District beat all records for the number of entries in clubs since club-work started. There were no fewer than eighty-two entries in the eight clubs formed there. The District Agriculturist at Courtenay organized the clubs for the district.

POULTRY-DISEASES.

Owing to the favourable spring weather fewer complaints were made as to mortality amongst the young chicks. As mentioned previously, a number of visits of the Instructors were asked for by breeders with reference to ovarian trouble.

During the latter part of the year, owing to the excessive rainfall in the Coast and Islands Districts, many outbreaks of colds and roup were recorded. Instructors were able to remedy the situation by advising against overcrowding and dirty litter. The excessive rainfall also drew attention to the fact that matters of inadequate ventilation will have to be considered, especially in the Fraser Valley District. Some breeders were forced to change litter almost daily owing to the sodden conditions. Precautions against driving rains in open-front houses was also recommended as remedy for this condition.

PUBLICATIONS.

During the year, in addition to the revision of several of the Department's bulletins, new bulletins were issued which proved to fill a long-felt want. A stencil bulletin on "Home Preservation of Eggs" received wide distribution, and "Some Good Egg Recipes," compiled by Miss Leighton, of the Department, proved useful to Women's Institute members and others. Articles were supplied to the farm journals of the Province, the departmental publication, the *Agricultural Journal*, and to various Provincial newspapers. The Egg-laying Contest monthly records were distributed as usual to the various institutions on the American continent, Europe, and Australia.

OFFICE-WORK.

An increased demand was experienced for all kinds of poultry bulletins, especially from back-yard breeders. This happened in 1912, 1915, 1920, and again this year. Every dull period seems to be taken advantage of by beginners to start in the business, commercially or otherwise. The reduced price of lumber, equipment, and feed greatly encourages this work. On the other hand, those unfortunately starting in the business during the period of inflation, oftentimes on borrowed capital, are severely hit by the reduction in values and dull times.

Many applications for particulars *re* poultry-raising generally in conjunction with small-fruit growing were received from intending settlers in Eastern Canada, Prairie points, Great Britain, and particularly from British possessions in the Far East.

In conclusion, the Division is of the opinion that present conditions will gradually better themselves and that the present low prices for products will rise owing to a bigger demand. Low prices induce consumption, just as rising prices for eggs in the fall slacken the demand.

Respectfully submitted.

J. R. TERRY,
Chief Poultry Instructor.

REPORT OF DAIRY COMMISSIONER, VICTORIA.

H. Rive, B.S.A.

Dr. Warnock, F.R.C.V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

Sir,—I beg to submit herewith my report as Dairy Commissioner for the year 1921.

General.

Good progress has been made by the dairy industry in British Columbia during 1921. Increased production is reported from the older dairy districts and new districts are being established.

The weather experienced during the year was not unfavourable, large crops of green forages and silo mixtures being harvested in many sections of the country.

Prices for dairy products experienced a considerable drop about midsummer, and while rising gradually towards winter, remained well below the figures of previous years. Prices of dairy feeds have also continued to decline.

In February F. Overland, formerly with the Union Milk Company, of Calgary, joined the staff of this Branch as Dairy Instructor and Inspector, replacing T. A. F. Wiancko, now of Toronto. Mr. Overland, whose duties will be chiefly on the Lower Mainland, has given good evidence of interest in and capacity for his work.

Creameries.

Calls have been made on all factories in the Province, though not as frequently as is desirable owing to lack of assistance. The creameries of British Columbia in the main are in good condition, with modern equipment, but these features even with skilled supervision in butter-making do not atone for careless or unsanitary handling of milk or cream on the farm. Calling on faulty patrons, therefore, ranks amongst the most important duties of the Inspector, but in this respect the outside districts have not received the necessary attention owing to the cause above mentioned.

The butter manufactured in British Columbia is of good quality, the creamery managers, with few exceptions, possessing a thorough appreciation of the requirements of the Canadian export butter standards which govern our wholesale markets. Great improvement still can be effected in the supplies from the farm.

The newly established creameries at Vanderhoof and Quesnel have made good progress and should in a short time be on a self-supporting basis. More dairy cattle, however, are required in these as in all the new districts.

Throughout the Province there exists a demand for dairy information and institutions. The tendency to establish small creameries in weak or new dairy districts is not being encouraged, but where transportation facilities exist efforts are being made to bring about a greater centralization, obviating undue costs of manufacturing which attend small enterprises.

Extract from the report of F. Overland, Provincial Dairy Instructor and Inspector:—

"*Creameries.*—In the early months of the year a visit was made to all the creameries of the Province. The greater number of these were found in good condition; many were making alterations and installing more modern and extensive machinery to cope with increased production. With the exception of a few of the smaller ones, the creameries of British Columbia now pasteurize the cream for butter-making. A second and third visit was made to the creameries on the Coast and Lower Mainland.

"About 500 inspection visits were made to farm dairies and stables on the Lower Mainland, and while a number were found in a satisfactory, many were only in a fair condition. There have been many new stables erected this year, improving sanitary conditions to some extent. Quite a number of dairy-farmers are striving to make their old stables do until the cost of labour and building material has further decreased. The past two years have given the dairy-farmers a small return only for their labour, and consequently until they secure better returns no great amount of building or improvements can be expected.

"Under these conditions it is rather difficult to show results of inspection-work, but assistance and advice were given on the care and handling of milk and cream.

"Samples of the milk from the farms were taken frequently as they arrived at the creamery and tested for temperature, sediment, and acidity.

"*Fall Fairs.*—Last fall the writer attended and acted as judge at the following fairs: Chilliwack, Richmond, and assisted A. P. Slade at Vancouver, New Westminster, and Victoria. The grade of butter shown was of excellent quality, with a large list of entries. In the creamery classes at Vancouver, New Westminster, and Victoria there were many entries from the Prairie Provinces.

"*Conventions.*—During the past year the following conventions were attended: The Northwestern Dairy Inspectors and Milk Dealers, Seattle; the British Columbia Dairymen's Association at Victoria and Vanderhoof; also the Dominion Butter-graders' Conference at Toronto."

A list of the manufacturing plants of the Province is herewith appended.

Dominion Educational Butter-scoring Contest.

The plan for 1921 was greatly altered from that of previous years, one creamery only from each Province participating each month for six months.

The fall butter-scoring meeting was this year held in Toronto. F. Overland attended as representative of this Branch.

Cheese-making.

The manufacture of Cheddar cheese in British Columbia increases steadily, if slowly, in spite of the competition experienced from Eastern Provinces. It is possible, however, that the surplus of milk on the Lower Mainland that for the past few years has been made into cheese of this type may find its way on to the market through more remunerative outlets, with a resulting decline in local manufacture.

There is room also for other varieties on the Coast markets, as our imports clearly show. The manufacture of simple types on the farm for home consumption should also be encouraged. Many requests for information on this subject have been received from Women's Institutes.

Information as to several types of cheese well suited to be manufactured commercially in British Columbia can be obtained from the Department of Dairying, University of British Columbia.

Condenseries.

The Pacific Milk Company, Limited, of Drake Street, Vancouver, with its condenseries at Ladner and Abbotsford, is still the sole operating condensery firm in this Province, the Borden Milk Company's plant at South Sumas remaining closed. The class of milk produced is of the unsweetened type, which finds a good market locally and is also shipped to Europe and the Far East.

Milk-powder.

A milk-power manufacturing company under the name of Dairy Products, Limited, has erected a factory at Chilliwack. It expects to commence operations shortly and should afford another profitable outlet for the butter-fat of the district.

Dairy Legislation.

An addition by Order in Council to the regulations made in connection with the "Creameries and Dairies Regulation Act, 1920," requiring the testing by licensees of creameries or dairies, and the reporting of the account of the test, of samples of milk or cream not less often than semi-monthly, represents activities under this heading.

Testers' Licences during 1921.

Seventeen candidates were examined by the Dairy Branch and seventy-three licences were issued. (List of testers holding licences appended.)

Dairy and Creamery Licences during 1921.

To forty-six persons or companies buying milk or cream on the butter-fat basis licences for businesses were issued. (List of creameries and dairies so licensed appended.)

Check-testers.

At the end of the present fiscal year the contribution of this Department for the last several years towards the salaries of check-testers on the Lower Mainland is being discontinued. The

Many of the interior valleys of southern B.C. are particularly adapted to the growing of Corn for silage. North-western Dent, Golden Glow, and Longfellow have given satisfactory results.

YEAR, 1921.—The production of all grains showed an increase in quantity of 39 per cent. over the previous year. (Scene on southern Vancouver Island.)

original purpose of this was to assist in furnishing competent and trustworthy testers to have charge of the testing-work of the factories of a district, and so eliminate from the patrons' minds suspicions of petty manipulations of the test on the part of rival concerns.

With the consolidation of dairy producers' interests on the Lower Mainland this work is no longer as between rivals, and has become the ordinary commercial work of one organization calling for no official arbitrator, and therefore without claim on departmental assistance.

COW-TESTING—MILK-RECORD WORK.

As in past years, considerable attention and direct financial support has been given to this movement. The associations have remained in charge of G. H. Thornbery, whose enthusiastic care for the work has not lessened. He reports as follows:—

"The returns received from each association during the last twelve months show a decided increase in the average yield per cow; in fact, all associations report a higher average than at any time since they were instituted.

"The average yield in the Chilliwack, Comox, and Langley-Surrey Associations for the year 1915 was 6,539 lb. of milk containing 266.1 lb. of butter-fat. During 1920 the average yield reported from these associations was 6,880 lb. of milk and 304.4 lb. of fat, or an increase of 38 lb. of fat per cow in these three dairy sections.

"*Testing Centres.*—New testing centres are in operation in the Powell River and Cowichan Districts, and the Courtenay Centre, which was started during 1920, continues to do valuable work amongst the small herds.

"*Official Testing.*—There has been a decided falling-off in the number of Holstein Advanced Registry tests carried out during the past year. Record of Performance and semi-official work are in many cases replacing the short-time official test.

"Testers have been supplied to the Colony Farm to supervise official tests, and also to conduct regular monthly semi-official tests, under the rules of the Holstein-Friesian Association of America.

"Following is a brief report of each association:—

"The returns from the Chilliwack Association show an improvement in the yield per cow over last year, although the number of cows reported is very small.

"Finances are not in a very satisfactory condition; in fact, there is a balance on the wrong side. This may be accounted for by a temporary lack of interest in the work, but we are glad to report that conditions have shown a decided improvement towards the end of the year and there is every indication that this association will soon be in good shape.

"Comox again holds premier place for the highest average yield per cow in British Columbia and, we believe, in Canada.

"The average yield of cows reported is 6,362 lb. of milk containing 324 lb. of butter-fat. The average for 1915 was 4,950 lb. of milk and 231.3 lb. of fat, showing an increase in five years of 1,412 lb. of milk and 93 lb. of fat per cow.

"The average for 1920 may seem abnormally high, but it is interesting to note that the average of the highest producing herd in this association is 9,119 lb. of milk and 486 lb. of fat.

"This herd of high-grade Jersey cows, amongst whose ancestors were Shorthorns, belongs to Mrs. McMillan, of Denman Island, and contains fourteen head. In 1917 this herd averaged 5,963 lb. of milk and 296 lb. of fat, a remarkable proof of the value of keeping record of what each cow is producing.

"The Langley-Surrey Association now covers a large area, reaching from Coquitlam to Matsqui, Glen Valley, Milner, Langley, and Surrey.

"It is hoped that it may be possible, in the near future, to increase the membership in the Port Hammond and Haney Districts, which would allow this large area to contain two separate associations.

"The association in the Richmond District has not shown much progress during the last year owing to a change of testers and also absence of tester on sick leave. Dairymen in the Ladner District have been called on with a view of making one healthy association out of these two large dairy sections.

"There is probably more interest and appreciation of the value of cow-testing work shown by the members of the Kelowna-Vernon Association than elsewhere. This is perhaps due to the fact that the district is comparatively new from a dairy standpoint, and for this reason the

monthly visits of the tester are of greater value to the members, in that he is able to be of more help to those who are keen to carry on their dairying operations in the most up-to-date and economical manner.

"The association has not been in operation long enough to be able to furnish any data in regard to average yields, but we are looking for a good showing this coming year.

"Much time has been spent during the last year visiting districts where Cow-testing Associations are in operation, with a view to creating a greater interest in the work. Problems dealing with the feeding, breeding, and weeding of dairy cows have been discussed, and where possible helpful information given towards their solution.

"It is frequently noted that the farmers are not using the information gained from testing their cows regularly to the best advantage, and it is becoming more apparent that the average member of a Cow-testing Association does not sufficiently appreciate the value of this work. This is a surprising fact when it is remembered that dairymen across the line are paying testing fees which are two or three times greater than those of the dairy-farmer of British Columbia.

"There are several reasons for this state of affairs, the most important of which is the fact that the Record of Performance work carried on by the Dominion Department of Agriculture is obtainable free of charge by owners of pure-bed cows. This fact is making it difficult to keep up the required number of cows in some of the associations.

"Practically all members have been visited twice during the past year, with the exception of those in the Kelowna-Vernon District, to whom a visit was paid in April.

"In conclusion, the prospects of giving greater service to all members of the associations are good and we anticipate a marked improvement in the interest taken in this work by the dairy-farmers of British Columbia."

BRITISH COLUMBIA DAIRYMEN'S ASSOCIATION.

The business of the association requires constant attention. Refunds on transportation charges of pure-bred dairy cattle have been made as in previous years. Prizes are awarded for production in the local Cow-testing Associations and in the C.N.R.P. classes in British Columbia.

A very successful display of milk values was made at the time of the annual convention in Victoria last February, and as an object-lesson was taken full advantage of by the domestic-science teachers of Victoria and their classes.

The summer meeting of the association was held at Vanderhoof, in the Nechako Valley, early in June. These meetings, though necessarily brief, arouse great interest and undoubtedly afford stimulation for new dairy districts.

Publications of the National Dairy Council have been brought in and distributed. The annual convention for 1922 occurs in Chilliwack on Wednesday and Thursday, February 22nd and 23rd.

DAIRY MANUFACTURERS.

The British Columbia Dairymen's Association being essentially an organization of producers, it is not advisable to discuss at its meetings topics technical and relating to the manufacture of dairy products. This field to-day offers an immense scope and requires a wide acquaintance with methods, tests, and theories not to be acquired speedily. There is in this Province no provision for meetings of those interested in treating and manufacturing, and on account of the nature of the already existing dairymen's organization as noted above, encouragement should be given for the establishment and a grant allowed for the support of a Dairy Manufacturers' Association of British Columbia.

There exists also in British Columbia no dairy school, as in other Provinces, offering during the winter months short courses of two or three months on subjects vital to beginners in dairy factories. It is advisable, therefore, that an appropriation be allowed for holding in Vancouver and at some point in the Interior, say at Salmon Arm, six-day courses for dairy manufacturers. The most important features only could be dealt with, such as butter-grading, cream-grading, acidimetry, neutralizers, cream-testing, etc.; this to continue for a few years in order to allow time for the organization of a dairy school. Some such arrangement appears necessary in view of the fact that the young men entering factories in British Columbia to-day have no opportunities whatever of discussing dairy problems with their fellows or of becoming conversant with up-to-date practice that may not be known to their immediate supervisors.

Publications.

During the year five circulars have been published. Of these, four dealt with farm cheese-making and were prepared for this Branch by Professors Sadler and Golding, of the Dairy Department of the University of British Columbia. Many requests have been received for this set from the Women's Institutes of the Province. The remaining one on "Varying Butter-fat Tests" (reprint) has been in good demand by creameries for distribution to their patrons.

Conclusion.

The dairy industry in British Columbia has reached a stage in its development where the natural increase in dairy cattle appreciably affects the annual returns of dairy production. Considering the probable amount and value to this Province in a very few years of its dairy commodities, more attention should be given than is at present to both producers and manufacturers.

Respectfully submitted.

Henry Rive,
Dairy Commissioner.

REPORT OF STATISTICIAN, VICTORIA.

Geo. H. Stewart.

Dr. D. Warnock, F.R.C.V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

Sir,—I beg to submit herewith the annual report of the Statistics Branch for the year ending December 31st, 1921.

Scope.

The duties of this Branch during the year consisted of the collection of data relating to agricultural production, imports, and exports. Figures relating to crop areas and numbers of live stock were collected by means of a postal census during the month of June. Card schedules were distributed to every farmer in the Province, to be filled in and returned to this office, where the compilation was completed.

Data relating to imports from other Provinces in Canada are now collected by means of returns from the distributers of agricultural food products in the Province. During the month of October 1,060 returns were dispatched to the various importers; of this number, 96 per cent. have been filled in and returned to this office. Data concerning importations from foreign countries are obtained from the Customs Department of the Dominion Government at Ottawa. All other returns in connection with the production of hops, wool, fruit, butter, cheese, etc., are now being collected and the results will soon be ready for publication. The fullest co-operation has existed throughout the year between the Dominion Bureau of Statistics and this Branch.

Crop Correspondents.

The voluntary services of 107 crop correspondents, located in all sections of the Province, were secured by this office at the beginning of the year. The duties of these correspondents consisted in rendering monthly reports to this office concerning the condition of crops, average yields, prices, weather conditions, etc. This enabled this Branch to furnish reliable and accurate information at all times regarding the agricultural industry in the Province.

In addition to these correspondents, a large number were appointed and asked to report to the Dominion Bureau of Statistics, Ottawa. By mutual agreement the results were exchanged and averages agreed upon. This eliminated the publication of conflicting figures and at the same time assured the greatest degree of accuracy.

POSTAL CENSUS, 1921.

The total number of cards mailed to individual farmers was 16,164; compiled, 5,986. The following were returned blank, etc.:—

"Removed" or "gone away"	425
Returned by recipients "not farming"	252
Returned noted "dead"	94
Not called for at post-office	756
Returned by post-office "unknown"	426
Total	1,953

After deducting the 1,953 cards returned by the post-office the estimated number of actual farmers is 14,211. The total number compiled would therefore be 42 per cent. of the estimated total farmers, to which was added 58 per cent. of the latter total.

The following table, extracted from the Dominion Government "Monthly Bulletin of Agricultural Statistics" for November, 1921, shows the percentage of returns received by each Province during the last five years. It will be noted there was a decrease in the percentage of returns received this year in British Columbia as compared with last year. This is accounted for owing to the fact that a large number of farmers did not return the card schedules, thinking it unnecessary to do so because of the decennial census which was also taken this year. The Province of British Columbia, however, still leads the other Provinces in the percentage of returns received.

Province.	Number of Farms, 1921.	Number of Returns.					Percentage of Returns.				
		1917.	1918.	1919.	1920.	1921.	1917.	1918.	1919.	1920.	1921.
Prince Edward Island	13,888	.....	7,766	3,770	4,903	4,414	.....	55.0	27.0	36.0	32.0
Nova Scotia	46,269	.....	20,868	12,136	16,249	16,781	.....	38.0	24.0	30.0	36.0
New Brunswick	35,562	.....	13,937	6,643	7,266	5,853	.....	36.0	17.0	19.5	16.0
Quebec	142,017	28,133	34,894	24,735	19,076	29,374	21.0	20.0	17.0	13.0	21.0
Ontario	184,337	.....	79,968	36,213	31,342	37,870	.....	43.0	19.0	17.0	20.0
Manitoba	55,184	.....	17,808	10,536	16,738	15,271	.....	38.0	21.0	33.0	28.0
Saskatchewan	120,900	35,592	46,089	35,531	35,939	32,660	34.0	44.0	34.0	34.6	27.0
Alberta	86,000	14,444	13,574	4,919	14,454	11,862	21.0	20.0	7.0	21.0	14.0
British Columbia	14,211	6,886	6,534	7,970	8,694	5,986	46.0	42.5	58.0	60.0	42.0
Totals	698,368	.....	241,438	142,453	154,661	160,071	.....	36.0	21.5	23.0	23.0

ORIENTAL SURVEY.

Due to the ever-increasing occupation of agricultural lands in the Province by Orientals, the Legislature during the spring session voted a sum of $2,000 to cover the cost of obtaining a complete record of all lands held by Orientals in British Columbia. This work commenced on April 1st and was carried on under the supervision of this Branch, where the compilation was also completed.

Valuable assistance was received in connection with this report from the Provincial Horticulturist and the members of his staff, also from the Inspector of Imported Fruit and Nursery Stock and his assistants. Your Statistician personally covered that portion of Vancouver Island from Duncan to Campbell River and the adjacent islands, also the Lower Mainland section of the Province from Vancouver to Haney, including the Municipalities of Point Grey, Burnaby, South Vancouver, and Coquitlam. The Government Agents in outlying portions of the Province were asked to submit returns to this office showing the lands occupied in their districts by Orientals. This enabled us to get a complete summary of all lands held, and at the same time eliminated a great deal of expense that would have been incurred should a personal visit have been made. The results of this survey have been placed before you and published in all the leading newspapers in the Province. (For final summary *see* Appendix No. 28.)

INFORMATION FOR FREIGHT-RATES CASE.

Considerable time was spent by your Statistician in obtaining information for G. G. McGeer, Counsel for the Government of British Columbia, in connection with their fight before the Dominion Board of Railway Commissioners for the equalization of freight rates in this Province.

This consisted of rendering comparative statements for the years 1910 to 1921, inclusive, showing the agricultural production year by year, the quantities and values of agricultural imports and exports, the numbers of farm live stock, the acreage planted to various crops, and other information concerning agriculture in this Province.

Farm Accounting.

Recognizing that the farmer, to successfully conduct the business of his farm, must keep some record of his business transactions, this Branch in 1920 designed the "Farm Account Book." One thousand copies of this book were printed, and so great was the demand that the last copy was distributed during the early months of 1921. It was found advisable to print a second edition of 1,000 copies, of which over 500 copies have already been distributed, with the demand daily increasing. Your Statistician has examined several of the books, and it is indeed gratifying to note the keen interest that is being displayed by the farmers and the creditable manner in which the entries are recorded.

General.

The total number of letters received by this Branch during the year was 1,843, while the total number of letters dispatched was 1,234. Eight circular letters, comprising in all 2,360 letters, were sent out to Farmers' Institutes, manufacturers of dairy products, etc. In addition to this, over 1,000 crop-report forms were dispatched to crop correspondents.

During the early part of the year Bulletin No. 88, "Agricultural Statistics, 1920," was issued. Of the 1,200 copies printed but forty copies remain to be distributed. During the year weekly reports have been furnished to several banking concerns, and numerous reports have been supplied to manufacturing and financial interests in Canada and the United States.

With the attention given to correspondence, the compilation of the June census and crop correspondents' returns, and other routine matters, the time of your Statistician has been fully occupied.

All of which is respectfully submitted.

G. H. Stewart,
Statistician.

REPORT OF CHIEF INSPECTOR OF APIARIES, NELSON.

W. J. Sheppard.

Dr. D. Warnock, F.R.C.V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

Sir,—I beg to submit my report as Chief Inspector of Apiaries, in special charge of the Kootenay and Okanagan territories, together with the reports of the Inspectors for Vancouver Island and Gulf Islands and the Fraser Valley, for the past season.

General Conditions.

The season of 1921, although showing an estimated total increase of 41 tons over last year, may be reckoned, on the whole, as being one of our poor years for honey production. In districts where there has been sufficient moisture to keep the nectar-yielding plants in good condition excellent crops of honey have been obtained. The irrigated sections of the Okanagan and Thompson River show up well in this respect, as also some portions of the Fraser Valley.

As indicated by the reports of the Inspectors for the Fraser Valley, European foul-brood, which has been so troublesome in the past in this part of the Province, shows improvement, largely owing to better methods of bee-keeping and the increased introduction of good Italian stock.

The system of establishing demonstration apiaries in different centres, which was started this year, for the purpose of drawing attention to the advantages of using up-to-date equipment and practising modern methods has produced excellent results in the Fraser Valley and shows the value of this innovation. Owing to the long distances to be covered to make the necessary

arrangements, demonstration apiaries in other parts of the Province could not be started early enough this season to show results. A separate report, together with a list of Provincial demonstration apiaries established to date, is appended.

The Lewis system for the treatment of European foul-brood, by spraying the combs with an antiseptic solution of sodium hypochlorite, has been tested by your Inspectors during the past season, and gives good promise of being a useful accessory in eliminating this disease. A separate report on the treatment is attached.

Several cases of American foul-brood have been found during the past season at the following places and promptly dealt with: At Nelson, Birchbank (near Trail), Willow Point, Camp Lister, Kelowna, and Chilliwack. Compensation has been paid to the bee-keepers for the frames of comb destroyed.

Outdoor demonstrations and lantern lectures on bee-keeping have been given by your Inspectors in different districts during the season whenever opportunity has occurred.

DEMONSTRATION APIARIES IN FRASER VALLEY, 1921.

With the opening of the spring of 1921 a new system of education for bee-keepers who wished to learn the most up-to-date methods of honey production and the control of bee-diseases in their own locality was adopted by the Department of Agriculture in the establishment of a number of demonstration apiaries in the Province. These apiaries were placed under the direct supervision and management of Apiary Inspectors.

Fifteen of them, numbering altogether forty-one colonies, were located at various points in the Fraser Valley in apiaries that were already established. The Department incurred no expense in the establishment of these apiaries, the owners of which purchased the equipment recommended by the Inspectors; the object in each case being to demonstrate the possibilities of honey production with the use of modern methods and equipment in that particular locality, also to have a model apiary within reach of every bee-keeper where the Inspectors could hold demonstrations and give "talks" on the problems of that particular district.

The first work undertaken was to see that every colony was put into first-class shape. Nearly all were requeened with a young vigorous Italian queen and the hive itself put in a Kootenay case (which has proved after several years' trial to be the ideal method of protection not only in the Interior, but in the milder districts of British Columbia). Many of the apiaries when taken over were in a run-down condition and nine of them were affected with European foul-brood.

A large amount of work and regular visits were required to get the colonies in shape for honey production. The result of this work at the close of the season has proven fully as successful as was anticipated, as the tables attached would indicate.

The apiaries showing an average of 150 lb. or more per colony were established with modern equipment and Italian stock prior to 1921, which naturally gave them the advantage over apiaries put into similar shape this season, and no doubt the rest will show better results in the future. Many bee-keepers in the vicinity of these apiaries have been watching them very closely, and upon comparing the results obtained from them with the returns from their own bees in the same location are adopting similar methods and equipment.

Natural swarming was eliminated in these apiaries and the colonies in several of them were increased 100 per cent. by artificial methods.

Many bee-keepers claim the season of 1921 to be the poorest that they have known for many years, but the results obtained in the big majority of the demonstration apiaries would seem to show that by the use of better methods good results can be obtained even in a poor year.

To increase the production of honey to any material extent and to eliminate disease it is very important that educational work of this description should largely take the place of general apiary inspection or supplement it as far as possible.

The whole situation may be summed up in the following words: "Keep Better Bees and Keep Bees Better."

THE LEWIS TREATMENT FOR EUROPEAN FOUL-BROOD.

With the approval of the Department of Agriculture, the Apiary Inspectors of British Columbia have spent considerable time during the season of 1921 in testing the efficiency of what is known as the Lewis treatment for European foul-brood. W. H. Lewis, of Edmonds, B.C.,

who made many experiments in 1920, announced that he believed he had found a new remedy for this disease. Sufficient evidence has been obtained this year to show that if the conditions are favourable—that is, if the weather is warm enough so that the bees are flying freely—the antiseptic used (sodium hypochlorite) may be expected to check the disease sufficiently to enable the bees to clean it up.

The first experiments conducted by the Inspectors were made in the Fraser Valley during the month of April. The weather then, with the exception of a few days, was wet and cold and the bees inactive, so that the work was carried on under difficulties and the results were not conclusive. Several things were found out at that time, however. The two proprietary antiseptic preparations, containing sodium hypochlorite, that were used are known and sold as "B-K" ("Bacili-Kil") and "Fecto." The strength of the solution that was first tried was 2 oz. of B-K, or Fecto, to the imperial gallon of water. This was subsequently increased to 4 oz. Mr. Lewis had suggested that it was possibly an advantage to add a little oil to the solution, which was also done. The plan followed was to shake the bees off the combs, which were then sprayed with a fine-mist sprayer so that the liquid would penetrate into each cell. The combs were then replaced in the hives as quickly as possible. It was not long before it was discovered that the solution killed all the eggs but that the larvæ escaped injury; also that it did not affect the bees adversely, but, on the other hand, acted as a great stimulus. After the spraying they quickly got to work cleaning up and the queens very soon started laying again. There was considerable reinfection, however, at that period which in all probability was mainly due to the weather being too cold for the bees to fly freely, so that they were hindered in cleaning out the diseased cells and getting rid of any infection that was left. When the experiments were continued later it was found that a solution containing 8 oz. of antiseptic to the imperial gallon of water gave better results, and the following may be taken as a typical example of what then occurred:—

June 28, 1921. Colony at Langley. European foul-brood, very bad; at least 60 per cent. of brood dead. Sprayed 8 oz. of B-K to gallon of water, to which 4 teaspoonfuls of "3 in 1" oil added.

July 2. Colony cleaning up well. No new infection.

July 14. About 5 per cent. new infection. Sprayed again, same strength as before.

July 29. One hundred per cent. clean. No trace of European foul-brood. Full of brood from side to side and storing honey well.

During the time these experiments were being carried out by the Apiary Inspectors in British Columbia, Arthur C. Miller, of Providence, Rhode Island, one of the most prominent bee-keepers in the United States, who had had his attention called to the possibilities of the Lewis treatment, made up his mind to give it a trial.

His first report, which was received about the end of May, is as follows: "One colony I treated with B-K, full strength, and while it killed some brood, they are now as clean as a hound's tooth." (Mr. Miller started off by using B-K at full strength to find out what dilution was necessary to avoid killing larvæ.)

His second report arrived about the middle of June, in which he said: "I have treated several complete apiaries and the results are glorious. The virulent type of European foul-brood is worse than the others, or than American foul-brood. Combs with it are simply filthy and big colonies will not touch the job of cleaning up, but after a dose of B-K, what a change! They clean up with feverish haste and the queen seems to outdo herself in egg production."

Mr. Miller's last report arrived about the middle of August. It is brief and emphatic. Summed up in five words, he says: "The Lewis cure *does* cure."

Sodium hypochlorite of approximately the same strength as B-K can be made as follows: Dissolve 6 lb. of sal soda in 2 gallons of hot water and 3 lb. of chloride of lime in 1 gallon of cold water. Pour together and allow to settle. The clear solution is ready for use. Once in a while the mixed solutions fail to clear. If so, heat the mixture and it will separate.

POUND PACKAGES OF BEES.

To test the advisability of importing bees in combless packages in preference to purchasing colonies in established hives or making increase by natural swarming or artificial methods, two packages of 2 lb. of bees and queen in each were received at Matsqui Demonstration Apiary No. 8 on May 19th. These were released in standard ten-frame hives and each given one frame of capped brood, one drawn comb partly filled with honey, and eight frames containing full sheets of foundation.

About 10 lb. of sugar in syrup form was fed slowly and continuously for three weeks. A second story was added on June 25th and a third story on August 1st, all containing foundation only.

Forty pounds of surplus honey was taken from each and over 60 lb. left for winter stores, leaving them as strong colonies in the best of condition to winter.

Six 2-lb. packages were received at Demonstration Apiary No. 2, Surrey, on May 23rd. Similar treatment was given them and a surplus of 30 lb. per colony was taken from them, leaving them to winter in two stories with full 60 lb. of stores.

Supervision was also given over the out-apiary of W. H. Lewis at Burnaby Lake, where fifty 2-lb. packages of bees with queens were shipped in from California on May 16th. Sugar-syrup was given these from the start and they were fed continuously until the brood-nest was well established, the only difference in treatment being that all drawn combs were given and no brood, as this apiary was composed entirely of package bees. Five hundred pounds, or an average of 10 lb. of sugar each, was fed before the second story was added.

Owing to the failure of the fireweed to secrete nectar in this locality no surplus was obtained, but all colonies built up well and filled the second story, which was left for winter stores. These are all in Kootenay cases, and given normal conditions should produce a very good surplus next season.

It is the opinion of your Inspectors that 2-lb. pakcages of bees in the hands of a practical bee-keeper are a profitable investment.

All of which is respectfully submitted.

W. J. SHEPPARD,
Chief Inspector of Apiaries.

REPORT OF ASSISTANT INSPECTOR OF APIARIES, VANCOUVER ISLAND AND GULF ISLANDS.

F. DUNDAS TODD.

W. J. Sheppard, Esq.,
Chief Inspector of Apiaries, Nelson, B.C.

SIR,—I beg to submit my annual report as Apiary Inspector for Vancouver Island and Gulf Islands District for the season of 1921.

My work for the season was largely confined to Vancouver Island. Until the end of May the time was practically occupied with special calls in various parts of the Island and Vancouver City. For the next three months I held demonstrations weekly at Duncan and Comox, responding to calls as occasion demanded. The latter part of the season was devoted to agricultural exhibitions, Vancouver, New Westminster, Duncan, and Victoria.

At Parksville European foul-brood still prevails. Though not of a virulent type, it failed to respond to the recognized treatment given it last year. A new outbreak was found on James Island, having been introduced by a settler from Fort Langley early in the year.

Towards the end of the season American foul-brood was discovered in two apiaries in South Ladysmith, probably developed from infected honey. Very large quantities of honey from the Antipodes that was stored during the war has been on sale on our market for two years. It is largely sold in granulated condition, so the consumers scrape the cans fairly clean and then throw them out. Bees from adjoining hives carry home the honey, too often introducing deadly disease with the easily got sweets.

The season of 1921 has been a very trying one for the bees. The first half of April was fine and prospects were very bright. The second half of the month was cold and wet, while frosts occurred nightly during the first week of May. Cool weather continued up to the end of June, hindering plant-development. The honey-crop of the different districts of Vancouver Island reflects the weather conditions. Round Victoria, where the season is early and strong growth had developed before the cool weather set in, the honey-crop is above the average for the region.

From Shawnigan Lake to Campbell River the season is from three to four weeks behind Victoria, so the cool wet weather of April and the frosts in early May caught the vegetation just as it was ready to store up the surplus food that is converted into nectar in June and July. The outcome was that no nectar was obtained by the bees from any plant excepting dandelion.

Round Alberni, where the seasonal developments are still later, the weather conditions were much more favourable when plant-growth started, and the result is a fine crop of honey for that district. One strong colony yielded 350 lb., while 50 lb. is easily the average.

In Central British Columbia bees are found in the Bulkley Valley and at Bella Coola. There the summer was cold and wet; consequently the crop is a failure and winter stores have been fed to the bees.

Respectfully submitted.

F. Dundas Todd,
Inspector of Apiaries.

REPORT OF ASSISTANT INSPECTOR OF APIARIES, LOWER FRASER DISTRICT.

W. H. Turnbull.

W. J. Sheppard, Esq.,
Chief Inspector of Apiaries, Nelson, B.C.

Sir,—Your Inspector for the Lower Mainland begs to report as follows:—

In the month of October, 1920, arrangements were made for the opening of an office in the Provincial Court-house, New Westminster, and your Inspector was placed in charge.

Beyond the regular routine of office-work and regular attendance at the office three days each week, the enforcing of the "marketing clause" of the "Apiaries Act" was undertaken. Very little trouble was experienced in this regard, as your Inspector found that the wholesale and retail merchants seemed to want to co-operate in every way possible. The main work that appeared to be necessary was to call on them and draw their attention to the Act and in some cases explain the reasons for it.

In February a large shipment of Guatemala honey was dumped on the Vancouver market and it was pretty well distributed among local merchants before it was found by your Inspector to be "underweight." It was decided to make a "test case" and the offending merchant was summoned under the City of Vancouver by-laws. The presecution had no trouble in getting a conviction and the honey in the original containers was afterwards withdrawn from sale and sold in "bulk."

Quite a number of meetings were held at various points during the winter months and a very keen interest was displayed by beginners as well as older bee-keepers. Several lantern demonstrations were held and your Inspector was assisted at these by A. W. Finlay, of Huntingdon. The time from March 31st, 1921, to October 31st is covered in a joint report with A. W. Finlay.

All of which is respectfully submitted.

Wm. H. Turnbull,
Assistant Inspector of Apiaries.

REPORT OF ASSISTANT INSPECTORS OF APIARIES, FRASER VALLEY.

A. W. Finlay and W. H. Turnbull.

W. J. Sheppard, Esq.,
Chief Inspector of Apiaries, Nelson, B.C.

Sir,—We beg to submit herewith our annual report as Apiary Inspectors for the Fraser Valley Districts for the season of 1921.

General Conditions.

As tests of the different treatments for European foul-brood were more economically conducted by two men working together, and as it was necessary in order to make a saving of time in putting demonstration apiaries in shape, the greater portion of this work was carried out by your two Inspectors for this district working together.

We, your Inspectors, find it almost impossible to prepare a separate report, as each would in many parts duplicate the other. All special calls were attended to and work at distant points was carried out by each Inspector in his own division.

Apiary inspection in the early spring (April–May) was conducted along the lines of previous seasons' work by visiting various apiaries in turn. On comparing conditions with last season's notes it was found that European foul-brood was still prevalent in the Fraser Valley, but not nearly as serious or in as great a number of colonies as in the past two years, this being principally due to the better methods of management as advocated by your Inspectors and to the large importation of pure-bred Italian queens.

While conducting the regular inspection-work the "Lewis treatment" for the cure of European foul-brood was tested in the early spring in a very large apiary, with the owner's co-operation. The tests were not productive of very definite results at that time, beyond determining the correct proportions of the antiseptic solution to use so as to avoid injury to the brood. As the weather at this time was cold and wet and unfavourable to the free flying of the bees, which would have helped them to clean up, further tests were postponed owing to the pressure of other work and until weather conditions were more favourable. In the meantime other well-known bee-keepers were testing the treatment, and very favourable reports were being received, claiming complete cure. Your Inspectors tested the treatment again in June, using more than twice the strength of the earlier antiseptic solution.

A colony at Langley Prairie showed 60 per cent. infection before treatment; five days later all dead and diseased larvæ were cleaned out of the hive and the queen laying well on three combs. A week later about 5 per cent. new infection appeared, in all probability from a few larvæ that had been capped over. A second treatment was then given and for the remainder of the season no further sign of the disease appeared. The colony built up to full strength and stored plenty of honey for winter use. When the latter treatment was given the weather was fine and warm, bees flying freely, but little or no honey coming in at the time.

This test, together with similar reports from other points, would indicate that the "Lewis treatment," if not an absolute cure, is at least a great help in the control of European foul-brood.

In view of the great amount of work necessary in the establishment of a number of demonstration apiaries in the Fraser Valley (a separate detailed report of which is attached), it was impossible to give general inspection to all apiaries in the district. As many as possible were visited and special calls were given preference and attention.

THE SEASON.

In the Fraser Valley the spring was cold and wet and very little honey was obtained, except in a few locations where the maples were abundant.

In open clover districts (Chilliwack, Sumas, and Delta) very little honey was gathered until July 1st or later, the Delta region being more favoured in this respect, a fair crop being obtained here from clover.

In fireweed locations and burned-over bush lands a slow honey-flow was obtained all summer from wild raspberries, blackberries, etc., resulting in a large amount of brood-rearing and consequently heavy consumption of stores, so that when the steady warm weather appeared rather late in the season a fine honey-crop was obtained in the low swamp lands and the heavy clay ridges where the nectar-bearing plants (principally fireweed) suffered little from the dry weather, while on the high lands the plants did not yield well and strong colonies soon consumed what stores they had, so that in many cases it was necessary to feed them for winter.

Generally the crop was light, though comparing favourably with the past two years, which were also poor.

EXHIBITION-WORK.

Great interest was taken in the exhibition of honey and other apiary products at the Provincial Exhibitions held at New Westminster and Victoria. Apart from the competitive classes, which contained the largest number of entries yet recorded at either place, a special display of honey from the demonstration apiaries was staged by your Inspectors. This display was featured in the form of a "golden cascade of honey," illuminated with flowing electric-light effects, and flanked with a collection of British Columbia nectar-producing plants, pressed and mounted.

The whole exhibit attracted considerable comment, both in New Westminster and Victoria, while daily demonstrations were given in the use of apiary appliances and equipment.

Following the exhibitions, extracting the honey-crop and packing the bees for winter concluded the work at the demonstration apiaries for the season.

American Foul-brood.

American foul-brood was discovered in one apiary in the Chilliwack District; every colony affected was promptly destroyed by fire and full compensation paid the owner.

All of which is respectfully submitted.

A. W. Finlay,
Wm. H. Turnbull,
Assistant Inspectors of Apiaries.

REPORT OF SECRETARY OF WOMEN'S INSTITUTES, VICTORIA.

Mrs. V. S. MacLachlan.

Dr. D .Warnock, F.R.C.V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

Sir,—I have the honour to submit herewith the annual report of the Women's Institutes of British Columbia for the year ending December 31st, 1921.

The year 1921 has been one of expansion and activity in almost every line of institute endeavour. The number has increased from eighty institutes at the close of 1920 to ninety-three at the close of 1921, and fully fifteen communities have applied for the necessary papers to secure incorporation, so that the prospect for aggressive action in the future is bright indeed.

No other organization occupies such a unique position in the affairs of the Province as the Women's Institutes; they are the logical educational agency between the Government and the people—the advance agent to forward legislation in all that pertains to social welfare. The function of the institute is twofold: First, the improvement of the conditions of rural life; and, secondly, following "as the night the day," the developing of our country-women in the larger matters of Provincial and national welfare.

Very few institutes in the Province to-day could be classed as non-active organizations. In almost every district where an institute operates there is goodly evidence of its existence. Whilst the chief function of the institutes has been educational rather than fund-raising, yet no small amount has been contributed annually to the Red Cross or the Navy League. Now, as times return to normal, the feeling is growing that the funds raised by the institutes should be administered by them and for the promotion of their own aims and objects.

There has been a strong feeling for some time towards Provincial organization, without which the institutes are a very loose organization. Within very wide limits each institute is a law unto itself; each is an isolated unit carrying on its bit of community work, absolutely independent of each other, with no idea of a Provincial working policy. All organizations carry on their various lines of work through committees; with this object in view, at a conference held in Victoria in December, 1920, an abortive attempt was made to start a district organization leading up to a Provincial; but not being familiar with the provisions of the "Agricultural Act," the legislation already provided was not used. At a succeeding conference in January, 1921, at New Westminster, a representative of the Department pointed out to the members of the conference that one delegate from each institute constituted the district institute, and any institute had the power to elect a Board of five Directors. Acting upon this information, this district institute proceeded to elect a Board of Directors and appointed committees to correspond to those of the Federated Women's Institutes of Canada.

The conference of the Okanagan District, held at Penticton the same month, passed a resolution expressing willingness to recommend Provincial federation, provided such was carried out in harmony and co-operation with the Department of Agriculture. On May 10th, 11th, and 12th, 1921, the Advisory Board of Women's Institutes met in the Parliament Buildings. Provincial federation was the chief topic of discussion, and the Secretary of the Board laid a working plan for Provincial federation before the members, the main points of which were approved by the members. This plan provided for the Provincial institute conference under existing legislation, by recommending that the four district institute conferences be held at one time and at one place in the Province and financed by the Department. The institutes of each district were to manage and finance the district institute conference in each respective district.

This plan was accordingly submitted to the four district institute conferences in the following order: The Okanagan and North Thompson in June, where with the exception of one delegate it was approved; at the Kootenay and Boundary in August, when, however, the delegates were recommended to return and explain the plan to their institutes; at the Lower Mainland Conference in October, eighteen out of twenty-four delegates voted in favour, while six delegates expressed the opinion that the institutes were not sufficiently informed; at the Vancouver Island Conference in November, after a great deal of criticism, no action was taken, and thus the matter rests at the present time.

The four conferences held during the year were conducted along somewhat different lines than formerly, the programmes being made up of committee reports and discussion. These committees reported on home economics, public health and child-welfare, education and better schools, legislation, immigration, agriculture, industries, publicity, and Women's Institute work and method. As this programme was an innovation and many of the district conveners had received no reports from the local conveners in the individual institutes, many of the reports were more in the form of addresses and in most cases consisted of practical information. The conference held at Victoria was a good example of the co-operation between the various Government departments and the committees appointed.

Home Economics.—The Labour Department, represented by Miss Marlatt, gave an interesting and illuminating address on employment of women.

Public Health and Child-welfare.—The Provincial Officer of Health spoke of the educational work already being done by the Women's Institutes; the assistance rendered by the Department of Education towards the salary of a School Nurse, the work done by a Public Health Nurse in a community, and the absolute need of support from the institute when a nurse entered a district.

Education and Better Schools.—J. W. Gibson spoke of the assistance rendered by the Department of Education in improving the school-grounds. Mr. Kyle, Organizer of Technical Education, had already explained the method of organizing classes in the rural districts in any line of technical work and the grant to the instructor's salary from the Department of Education.

Legislation.—An able address was given on legislation, or what women can do in furthering legislation and in making legislation effective that is already on our statute-books. A summary of all recent legislation in regard to women and children was also given. It was stated that a summary of recent legislation would be supplied to institutes.

Immigration.—This subject was discussed, but the chief result was a resolution against Oriental occupation.

Agriculture.—In regard to agriculture, the provisions of the Land Settlement Board and conditions of money loans were fully explained by Mr. Hunt, while F. W. Laing gave a detailed explanation of the stumping-powder rebate and method of purchase. Price of milk and distribution was the subject of a round-table conference, with Mr. Waterhouse leading the discussion.

Industries.—As regards industries, the session was somewhat of a disappointment as no speaker was available.

An unusual feature of the conference was an afternoon spent in the galleries of the Legislature.

The other three conferences had been conducted along the same lines. The Vancouver Island Conference has been described in detail because the report of each committee was supplemented with information from the different Government departments. The Kootenay Conference had the honour of an address from Mrs. Pankhurst on immigration. Each conference was unanimous in expressing approval of this programme, consisting of committee reports, and voted to have future conferences conducted along the same lines. With the idea of encouraging committees' work, a questionnaire was submitted to the institutes and information received on the different branches.

HOME ECONOMICS.

While undoubtedly valuable assistance and information was conveyed to the farm-women by lecture demonstrations, still it was felt that the value received was hardly in proportion to the money expended. When the instruction given by the demonstrator was put into practice the housewife found many points upon which she needed further information and guidance, but the lecturer was by that time at a point far distant. If a course of lessons was given and the pupils had time to use the instructions, finding out the difficulties, they could have these explained

at the following lesson. Accordingly a plan to make use of the night-school legislation was worked out and a method outlined by Mr. Kyle is being rapidly brought into use by the institutes. Nine institutes have conducted classes very successfully.

"In the first place, it must be distinctly understood that the school trustees are the representatives of the people in educational work, and that same body represents the Department of Education. The School Boards are thus the intermediaries between the Education Department and the people. All night-schools must therefore be conducted under their auspices, and all payments made by the Department of Education to the Secretary of the School Board, or, to be more correct, to the municipality through the Secretary of the Board.

"If a Women's Institute wishes to start a class and avail themselves of Government grants, they must go to the School Board with a list of intending students and make application for a class to be organized. The Women's Institute may offer to act in an advisory capacity for the conducting of work which essentially belongs to their sphere, and they might even be prepared to recommend an efficient instructor to the School Board.

"The Women's Institute would naturally prefer to have the School Board approach them and request that they act in an advisory capacity, but it must be realized that School Boards are kept very busy with day-schools, and as a rule neither the Secretary nor the Board are anxious to increase their labours by undertaking night-school work. When, however, they have the classes arranged for them, they will be found to be extremely interested.

"The number of students in each class should number fifteen or twenty, with an average attendance of ten as a minimum. If the class falls below that number the grant will be in danger of being disallowed.

"It is of the utmost importance that a good instructor be found; she need not have a British Columbia certificate to teach in school, but she must be proficient in her work. If a dressmaking class is being organized, obtain the services of a competent dressmaker, a person who makes her living at the trade, whose work has commercial value. The number of lessons per week or term and the salary to be paid should be decided by the Women's Institute.

"After the class of students has been organized and the instructor decided upon, the Secretary of the School Board should be requested to write to the Education Department, notifying them of the steps taken and asking for their financial assistance. In a rural municipality and in cities of the third class it is customary to pay a liberal grant of four-fifths of the teacher's salary, leaving the remaining fifth, together with any expense for heat, light, and janitor's attendance, to be met by fees.

"Special night-school registers and books of monthly report forms may be obtained by writing to the Free Text-book Department, Parliament Buildings, Victoria.

"The instructors must keep a careful record of attendances and send a monthly report in duplicate to the Secretary of the School Board, who in turn will send one copy of the report to the Department of Education, together with a copy of the pay-roll. On receipt of this the grant will be paid by the Department to the Secretary of the School Board.

"It will thus be seen that the whole routine is businesslike and simply means that no moneys are paid from the Department of Education until evidence is given of the class having been held and the instructor having been paid by the School Board.

"The subjects which it is possible to conduct in night-schools are varied, but the most popular are dressmaking, millinery, and cookery. Such subjects as spinning, lace-making, wood-carving, agriculture, and horticulture have a future before them and a sure commercial value, both as a means of earning one's daily bread and also as a hobby.

"In the Province of British Columbia last winter there were 135 teachers and 3,021 students."

Public Health and Child-welfare.

A Dominion Child-welfare Council was formed by the Federal Ministry of Health on October 19th, 1920, and the Provincial departments following this idea and in order to co-ordinate the work are each forming corresponding Provincial Councils.

Recognizing that the success of the Provincial child-welfare movement in rural British Columbia depends almost entirely upon the influence of the Women's Institutes, and in appreciation of the assistance already rendered by individual institutes, the Board of Health issued invitations on February 21st to the members of the Public Health and Child-welfare Committees, appointed at the recent conferences, to consult with the Provincial Board as to what particular

phase of this work could be recommended to the institutes, and also the most expedient means of carrying out a definite Provincial policy.

The work for the conference to discuss was divided into three parts, as follows:—

(*a.*) A uniform plan of work to recommend to the institutes.

(*b.*) Method by which each individual institute will carry out this plan.

(*c.*) Relation of the institutes to the Provincial Child-welfare Council.

The suggested division of the work under the above heads was as follows:—

(*a.*) *Uniform Plan of Work.*—(1.) Pre-natal. Registry of expectant mothers. Institute centres of distribution of literature prepared by the Board of Health. (2.) Registry of all children of pre-school age in order to supply mothers with diet folders. (3.) School-children.

(*b.*) *Method for each Institute.*—(1.) Public Health and Child-welfare Committee appointed. From that committee one member to be responsible for knowing of expectant mothers and forwarding names to Board of Health for letters. Distribution of literature to these and the mothers of pre-school children. Members of medical profession, and especially the Medical Health Officer, asked to co-operate. (2.) Warm lunches, milk, etc., to be provided where necessary. Health crusade, tooth and handkerchief drills, and inculcation of all health habits made an important part of the school programme, guaranteeing wherever possible that a child shall leave school with health established. The teacher, whether man or woman, should be on this committee; the support and co-operation of the Superintendent of Education be secured in this. (3.) Provision for the removal of injurious physical defects, etc. Operative clinics for this purpose could be recommended to the institute as a whole and carried out by plans similar to those which have proved such a success in Peel County, Ontario. (4.) Another member of this committee to be responsible for a survey of school conditions.

(*c.*) Relation of the institutes to the Provincial Child-welfare Council.

The idea, which it was hoped the institutes would find practical, is for each institute either to take the lead or to assist in forming a Child-welfare Committee or Council to carry out the work as outlined from the Federal Department. The uniform plan was submitted in detail; the "Canadian Mothers' Book," application forms for advisory letters, and diet folders were supplied to each institute. The response has been very encouraging. The ninety-seven institutes have received and distributed the material and many application forms have been received. Sixty-two institutes have formed committees. In Esquimalt the institute took the lead and formed a Child Hygiene Council, co-operating with the Parent-Teachers, the Imperial Order of the Daughters of the Empire, the Women's Christian Temperance Union, the School Board, and the Municipal Council. Pre-natal and infant welfare, pre-school and school welfare are all looked after through clinics held periodically with the help of the school doctor, dentist, and nurse.

On December 8th and 9th the conveners of the committees of the institutes on Vancouver Island were called into conference and the Vancouver Island Council for Child Hygiene formally organized; the Public Health and Child-welfare Committees of the institutes functioning as local councils where the institutes are the only organizations, otherwise following the example of Esquimalt.

At the request of the district institute conferences, and at the expense of the Provincial Board of Health, the district conveners were sent through their respective districts, visiting the institutes and explaining the policy in detail, thus giving an added impetus to the work.

The object is twofold—to work the district up to the point of demanding and maintaining the services of a Public Health Nurse, and to educate public opinion in order that the nurse, when she comes, may have the support and co-operation of an enlightened community.

In 1920 an amendment to the "Public Schools Act" was passed which gave School Boards the power to employ nurses and dental surgeons on the same basis as school-teachers, as follows: Cities of the first class receive a grant of $460 per nurse; cities of the second class receive a grant of $520 per nurse; cities of the third class receive a grant of $565 per nurse; municipal and rural school districts receive a grant of $580 per nurse.

But the following grouping of school districts is also allowed for this purpose: If the School Boards of a municipality or rural school district decide that the nurse's salary shall be $125 per month for the twelve months of the year, the Government will grant $48.33 per month, leaving a balance of $76.67 for the School Boards to make up. While no one rural school district could attempt to raise that amount, a group of from five to seven school districts could, at the

annual school meetings, each vote its proportional share of this sum, which would be $10 (slightly more or less) per month per school district. This would not work a hardship on any individual district and yet it provides salary required.

This plan is working out very successfully. Vernon Women's Institute took the lead in that town, and with the assistance of the Provincial Board of Health supported a nurse for three months. At the end of that time the value of the nurse's services had been so fully demonstrated that the community now does the entire financing, making use of the grant from the Department of Education. Inquiries are being received from other districts for similar assistance.

Education and Better Schools.

This committee has been duly appointed, but has not received the same attention as that paid to public health and child-welfare. Thirty-nine committees have been formed. The difficulty seems to be a lack of knowledge of the need for any improvement in the buildings or grounds. There is a lamentable lack of knowledge regarding the school law. There is great need for consolidation in many parts. In the Kootenay District the efforts of two institutes were crowned with success in this respect, when four school districts consolidated after two years' patient work.

The assistance rendered by the Department of Education to school districts in beautifying and improving the grounds is described in the following extract from Department Circular No. 1 *re* school-grounds improvement. This should be known more widely and would be of encouragement to the women:—

"The maximum grant given by the Department will be dependent upon the size of the grounds and the number of rooms in the school usually occupied. The schools will be classified as follows: (1) One or two rooms; (2) three or four rooms; (3) five or six rooms; (4) seven or eight rooms; (5) more than eight rooms; and the minimum area on which grants will be given is as follows: (1) One or two rooms, 1 acre; (2) three or four rooms, 1½ acres; (3) five or six rooms, 2 acres; (4) seven or eight rooms, 2½ acres; (5) more than eight rooms, 3 acres. The maximum grants to be given by the Department on this condition and classification are given is as follows: (1) One or two rooms, 1 acre; (2) three or four rooms, 1½ acres; (3) five four-room school, minimum area of grounds 1½ acres, $175; (3) five- or six-room school, minimum area of grounds 2 acres, $225; (4) seven- or eight-room school, minimum area of grounds 2½ acres, $275; (5) more than eight-room school, minimum area of grounds 3 acres, $350.

"School Boards wishing to avail themselves of this offer must notify the Director of Elementary Agricultural Education, and in doing so must enclose a plan of the school-grounds drawn to a scale, giving dimensions of grounds, location and dimensions of buildings, walks, streets, etc. The improvements to be defined in connection with these plans must have the approval of the Department, and must be carried out within a period of two years from the time that said scheme of improvement receives the approval of the Department.

"*Annual Grants towards Maintenance of School-grounds.*—In order to assist School Boards in keeping the school-grounds neat and attractive from year to year, the Department will make annually certain maintenance grants based upon the reports of local School Inspectors. A scheme of classification similar to that already outlined for school-gardens will be followed here. These annual grants for maintenance will not be paid to School Boards engaged in an initial scheme of school-ground improvement until the year following the completion of that scheme for which grants have already been provided.

"The annual grants for maintenance are as follows:—

	Grade A.	Grade B.	Grade C.
One-room school	$15 00	$10 00	$ 5 00
Two-room school	24 00	16 00	8 00
Three- or four-room school	33 00	22 00	11 00
Five- or six-room school	42 00	28 00	14 00
Seven- or eight-room school	51 00	34 00	17 00

"School Boards undertaking the improvement of their school-grounds with the advice and approval of the Department are *eligible to receive additional assistance in the form of ornamental trees and shrubs from the Provincial Schools Nursery. Transportation charges on such nursery stock must in all cases be met by the School Board.*"

With the committees formed at the close of 1921, the institutes may look forward to an increased interest in school matters, more especially as there are twenty-six institutes reporting that their districts have women on the School Boards.

LEGISLATION.

With the exception of a few casual addresses, there has been no attempt on the part of the members to become familiar with the legislation for which women have clamoured and men have put on the statute-books of this Province, and this in spite of the fact that the Province of British Columbia is in the lead in the North American Continent. In this branch also it is expected that we can convey information by means of the committee.

IMMIGRATION.

An awakened interest has been manifested in this subject, both European and Oriental, by the startling figures given by J. S. Cowper at the Lower Mainland Conference in Chilliwack last October. Since that date many requests have been received for information on this subject. Figures compiled by the Statistician showing the extent of Oriental occupation in the Fraser Valley brought the matter home very potently.

LOCAL NEIGHBOURHOOD NEEDS.

Sixteen institutes have reported the building or improving of community halls during 1921. Six have reported purchasing land for or fencing and beautifying local cemeteries. Ten report establishing libraries.

AGRICULTURE.

As agriculture ranks second in importance among the Provincial resources, it was thought advisable to ask how many institutes had members who availed themselves of the publications supplied by the Department of Agriculture. Of the ninety-seven institutes, there were always some members who had received information in the form of bulletins. The stumping-powder regulations were not so well understood, much less the provisions of the Land Settlement Board or conditions of money loans.

INDUSTRIES.

With the exception of Nelson Institute, there has been no attempt to start an industry by organized effort. Nelson, however, has two looms and is already putting out tweeds. Individual members have reported success at weaving, spinning, and basket-making. The institutes have been recommended to encourage home industries by buying made in B.C. products.

PUBLICITY.

Little has been done in this line other than reporting meetings in the local papers.

WOMEN'S INSTITUTE WORK AND METHOD.

Through the efforts of Mrs. Alfred Watt, M.B.E., M.A., the attention of the members was called to the fact that the institutes were being used as financial agents by other organizations. Accordingly the question was asked as to what part of the funds raised had been for other organizations. The result was an effort to manage and finance the different work through the splendid machinery of our own organization, co-operating with our own Government departments in carrying out the various branches of social and community endeavour.

In conclusion, I may say that a desire for information and instruction on the method of carrying on work in the foregoing branches is shown by the number of inquiries being received from the institutes. From present indications there is every reason to hope that the influence of the British Columbia Women's Institutes will become of even greater value to the community in the forthcoming year, as there is no doubt that the members show a marked desire for a wider knowledge on all matters of citizenship and true patriotism.

Respectfully submitted.

V. S. MACLACHLAN,
Secretary, Women's Institutes.

APPENDICES.

APPENDIX No. 1.

TOTAL CORRESPONDENCE RECEIVED AND DISPATCHED BY THE DEPARTMENT OF AGRICULTURE (AT VICTORIA) FOR THE YEARS ENDING DECEMBER 31ST, 1920 AND 1921.

	RECEIVED.		DISPATCHED.	
	1921.	1920.	1921.	1920.
Office of the Deputy Minister—				
General	8,294	8,850	7,804	6,193
Farmers' Institutes	2,688	1,412	1,058	1,181
Women's Institutes	768	909	408	361
Agricultural Associations	507	461	662	583
Secretary, Women's Institutes	1,274	715	1,221	908
Dairy Branch	1,168	1,157	1,129	1,736
Horticultural Branch	2,060	2,173	2,140	2,249
Live Stock Branch—				
General	3,841	4,128	3,191	6,013
Brands	1,658	2,420	2,394	2,902
Poultry Division	2,406	1,857	4,950	3,295
Soil and Crop Division	1,087	294	1,676	641
Publications Branch (to March 17th only)	365	1,714	353	2,226
Statistics Branch	1,843	1,960	1,234	1,364
Totals	27,959	28,050	28,220	29,652

APPENDIX No. 2.

WOMEN'S INSTITUTE FLOWER-SHOWS, ETC., 1921.

Date.	Name of Women's Institute.	Remarks.
April 16	South Saanich	Bulb and flower show.
May 26	Atchelitz	School-children's work.
June 10	Rutland	"Better babies" clinic and health exhibit.
„ 16	Hatzic	Flower-show.
„ 23	Lake Hill	Flower-show; exhibition of school-children's work.
„ 24	Strawberry Vale	Exhibition of school-children's work.
„ 25	Matsqui	Flower-show.
July 4	Comox	Flower-show; exhibition of school-children's work.
„ 6	West Saanich	Flower-show; exhibition of women's work and school-children's work.
„ 6	Agassiz	Flower-show.
„ 7	Sooke	Flower-show; exhibition of women's work and school-children's work.
„ 7	Parksville	Flower-show.
„ 27	Surrey	Flower-show; exhibition of women's work.
„ 28	Kaslo	Flower-show; "better babies" clinic.
Aug. 3	Langley Fort	Flower-show; exhibition of women's work and school-children's work.
„ 4	Chilliwack	Flower-show; exhibition of women's work.
„ 4	Colwood	Flower-show.
„ 5	Salmon River Valley	Flower-show; exhibition of women's work and school-children's work.
„ 11	Nakusp	Flower-show; exhibition of school-children's work.
„ 17	Silver Creek	Flower-show; exhibition of women's work and school-children's work.
„ 17	North Saanich	Flower-show; exhibition of women's work and school-children's work.
„ 18	Mission City	Flower-show; "better babies" clinic.
„ 19	Harrop	Flower-show; exhibition of women's work and school-children's work.
„ 23	Langford	Flower-show.

APPENDIX No. 2—*Continued.*

WOMEN'S INSTITUTE FLOWER-SHOWS, ETC.—*Continued.*

Date.	Name of Women's Institute.	Remarks.
Aug. 31	Tynehead	Flower-show; exhibition of women's work and school-children's work.
„ 31	Garden City	Flower-show; exhibition of women's work.
„ 31	Strawberry Hill	Flower-show; exhibition of women's work and school-children's work.
„ 31	Willow Point	Flower-show; exhibition of women's work and school-children's work.
„ 31	Esquimalt	Flower-show, etc.
Sept. 1	Central Park	Flower-show; exhibition of women's work, school-children's work, and "better babies" clinic.
„ 1	Cranbrook	Flower-show; "better babies" clinic.
„ 2	Similkameen	Flower-show; exhibition of women's work.
„ 2	South Saltspring Island	Flower-show.
„ 4	Tappen	Flower-show.
„ 4	Metchosin	Flower-show; exhibition of women's work and school-children's work.
„ 10	Cobble Hill	Exhibition of women's work (with Fall Fair).
„ 20–22	Armstrong	Exhibition of women's work and school-children's work.
„ 21	Hazelmere	Flower-show; exhibition of women's work and school-children's work.
„ 21	Vernon	Flower-show.
„ 21–23	Nelson	Flower-show; exhibition of women's work.
„ 22	Coquitlam	Flower-show; exhibition of women's work and school-children's work.
„ 23	Rock Creek	Flower-show.
„ 23	Denman Island	Flower-show; exhibition of women's work and school-children's work (in conjunction with Fall Fair).
„ 23	Hornby Island	Flower-show; exhibition of women's work.
„ 27	New Denver	Flower-show; exhibition of women's work.
„ 30	Cawston	Flower-show; exhibition of women's work and school-children's work.
„ 30	Salmon Arm	Flower-show.
Oct. 1	Arrow Park	Flower-show.
„ 5	Creston	"Better babies" clinic.
„ 5	South Vancouver	Flower-show; exhibition of women's work and school-children's work.
„ 7	Rock Creek	Flower-show; exhibition of women's work.
„ 12	Peachland	Flower-show; exhibition of women's work.
„ 12	Mount Ida	"Better babies" clinic.
Nov. 2–3	Summerland	Exhibition of women's work and school-children's work.
„ 2–3	West Summerland	Exhibition of women's work and school-children's work.

APPENDIX No. 3.

AGRICULTURAL FAIRS, ETC.—GRANTS IN AID OF PRIZE-LISTS.

Name.	Grant paid.
Kamloops District Stock-breeders	$ 488 00
British Columbia Goat-breeders' Association	250 00
Chilliwack Agricultural Association	920 00
Cowichan Agricultural Society	699 90
Howe Sound Farmers' Institute	25 00
Vancouver Exhibition Association	6,377 00
Abbotsford-Sumas Agricultural Association	168 00
Royal Agricultural Society, Westminster	8,546 00
Langley Agricultural Society	323 00
Hilliers and District Agricultural Association	80 00
Sooke Farmers' Institute	50 00
Terrace Fall Fair Association	73 00
Penticton Agricultural Association	342 00
North Vancouver Horticultural Society	128 00
Burquitlam Agricultural Association	168 00
Coquitlam Agricultural Society	137 00
Fort George Agricultural Society	150 00
Golden Agricultural Society	114 00

APPENDIX No. 3—*Continued.*

AGRICULTURAL FAIRS, ETC.—GRANTS IN AID OF PRIZE-LISTS—*Continued.*

Name.	Grant paid.
Elk Valley & Natal Agricultural Society	$ 87 00
McBride Farmers' Institute	50 00
Trail Fruit Fair	231 00
Northern British Columbia Agricultural Association	442 00
Delta Agricultural Association	277 00
Slocan Lake Agricultural Association	161 00
Pritchard Agricultural Association	201 00
Matsqui Agricultural Association	210 00
Arrow Lake Agricultural Association	141 00
Agassiz Horticultural Association	197 00
British Columbia Agricultural and Industrial Association	4,888 00
Whonnock Farmers' Institute	45 00
North and South Saanich Agricultural Association	331 00
Islands Agricultural Association	94 00
Comox Agricultural Association	353 00
Denman Island Farmers' Institute	60 00
Cobble Hill Agricultural Association	46 00
Creston Valley Agricultural Association	163 00
Alberni Agricultural Association	120 00
Forest Grove Farmers' Institute	50 00
Salmon Arm and Shuswap Agricultural Association	443 00
Slocan Valley	53 00
Aldergrove Agricultural Association	98 00
Bulkley Valley Agricultural Association	274 00
Kelowna Agricultural and Horticultural Association	573 00
Ladysmith Agricultural Society	140 00
Lasqueti Island Agricultural Association	50 00
Lumby District Agricultural Association	220 00
Mission Agricultural Association	264 00
Nanoose Agricultural Association	83 00
Nelson Agricultural Association	468 00
Richmond Agricultural Association	224 00
Squamish Farmers' Institute	50 00
District of Surrey Agricultural Association	378 00
Windermere District Agricultural Association	162 00
Kootenay Lake Farmers' Institute	50 00
Cariboo Agricultural Association	81 00
Summerland Agricultural Association	167 00
Rock Creek Farmers' Institute	50 00
Fruitvale Agricultural Association	49 00
Windermere District Fat-stock Show (winter)	250 00
District poultry-shows (9)	4,000 00
Total	$35,312 90

APPENDIX No. 4.

PRUNING-SCHOOLS, 1921.

Place.	Instructor.	Dates.	Pupils.
Islands.			
Qualicum Beach	K. W. Munson	January 31 to February 4	17
Denman Island	„	February 7 to 11	14
Gordon Head	E. W. White	„ 7 to 11	19
Duncan	„	„ 14 to 18	10
Ladysmith	K. W. Munson	„ 14 to 18	11
Saltspring	E. W. White	„ 21 to 25	8
Nanaimo	„	„ 28 to March 4	8
Pender Island	„	March 7 to 11	9
			96
Lower Mainland.			
Burnaby Lake	W. H. Robertson	January 24 to 28	11
Whonnock	„	„ 21 to February 4	15
Chilliwack	„	February 14 to 18	16
Murrayville	„	„ 21 to 25	7
Milner	K. W. Munson	„ 28 to March 4	10
Hazelmere	W. H. Robertson	March 14 to 18	10
			69
Okanagan.			
Rutland	M. H. Chesbro	January 10 to 14	18
„	„	„ 17 to 21	18
Salmon Arm East	C. R. Barlow	„ 17 to 22	14
„ Town	J. Tait	„ 17 to 22	11
„ West	„	„ 24 to 29	9
South Canoe	C. R. Barlow	„ 24 to 29	12
North Canoe	„	February 1 to February 5	8
Kelowna	Ben Hoy	November 15 to 21	10
Penticton	„	„ 28 to December 2	11
Vernon B.X.	H. H. Evans	December 5 to 9	15
Kelowna	M. S. Middleton	„ 5 to 9	12
„	„	„ 12 to 16	11
Summerland	Ben Hoy	„ 5 to 10	15
Kelowna	„	„ 12 to 16	8
S. Vernon	M. S. Middleton	„ 27 to 31	8
Coldstream	„	November 21 to 26	8
			188
Kootenays.			
Procter	E. C. Hunt	February 22 to 26	9
Gray Creek	„	March 1 to 4	12
Nakusp	„	„ 22 to 26	7
Arrow Park	„	„ 29 to April 1	9
Creston	C. B. Twigg	February 28 to March 4	8
Erickson	„	March 7 to 12	6
Canyon City	„	„ 14 to 18	8
Appledale	„	„ 21 to 24	13
Slocan Park	„	„ 31 to April 5	8
Grand Forks	„	November 22 to 26	8
			88

Total number of schools, 40; total number of pupils, 441.

APPENDIX No. 5.

PACKING-SCHOOLS, 1921.

Place.	Instructor.	Dates.	Pupils.
Grand Forks	E. C. Hunt	January 31 to February 4	20
Kaslo	„	February 8 to 11	13
Erickson	H. Guy Greenwood	January 31 to February 5	10
Wynndel	„	February 7 to 12	14
Salmon Arm	Miss Ruth Blair	March 21 to 26	9
Canoe	„	March 28 to April 2	9
Oyama	T. Booth	August 9 to 13	14
Slocan Park	E. C. Hunt	December 19 to 23	10

Total number of schools, 8; total number of pupils, 99.

APPENDIX No. 6.

DATES OF BLOOM, KELOWNA DISTRICT, SUB-DISTRICT K.L.O.

To discover the Exact and Relative Dates when Important Varieties come into Bloom and shed their Petals.

Variety.	First Show of Blossom.	Full Blossom.	Petals falling.
McIntosh	May 6	May 13	May 17
Jonathan	„ 8	„ 14	„ 17
Wagener	„ 4	„ 10	„ 14
Wealthy	„ 4	„ 10	„ 16
Delicious	„ 12	„ 17	„ 20
Newtown	„ 5	„ 12	„ 16
Rome Beauty	„ 11	„ 16	„ 20
Spy	„ 11	„ 16	„ 20
Flemish Beauty	„ 4	„ 10	„ 14
Bartlett	„ 4	„ 10	„ 14
D'Anjou	„ 4	„ 10	„ 14

APPENDIX No. 7.

APPLE-THINNING DEMONSTRATION, KELOWNA, 1921.

Plot.	Date thinned.	Average Size when thinned.	Yields.			Average Total Yield per Tree.
			No. 1's.	No. 2's.	No. 3's.	
		Inches.	Lb.	Lb.	Lb.	Lb.
No. 1	May 27					
McIntosh	.....	½	334	197	82	122.6
Jonathan	.....	⅜	294	84	210	117.7
No. 2	June 3					
McIntosh	.....	⅞	550	110	...	132.0
Jonathan	.....	⅝	84	126	42	50.4
No. 3	June 10					
McIntosh	.....	1	274	283	100	131.4
Jonathan	.....	¾	378	84	42	100.8
No. 4	June 17					
McIntosh	.....	1¼	351	98	13	92.4
Jonathan	.....	1	210	...	42	50.4
No. 5	June 24					
McIntosh	.....	1⅜	198	156	10	72.8
Jonathan	.....	1¼	294	42	42	75.6
No. 6	July 4					
McIntosh	.....	2	252	115	...	73.4
Jonathan	.....	1¾	294	...	42	67.2
No. 7	July 11					
McIntosh	.....	2¼	315	138	26	95.8
Jonathan	.....	2	378	...	84	92.4
No. 8 (check-plot)—						
McIntosh	.....	...	315	220	48	111.6
Jonathan	.....	...	336	42	84	92.4

APPENDIX No. 8.

MEMORANDUM OF IMPORTED FRUIT, POTATOES, CORN, ETC., INSPECTED AT ALL PORTS OF ENTRY IN BRITISH COLUMBIA (INCLUDING THOSE CONDEMNED).

	1920.	1921.
Apples (boxes)	87,411	85,601
„ (½ boxes)	209	290
„ (barrels)	10	7
Crab-apples (boxes)	43	78
„ (½ boxes)	.....	3
Pears (boxes)	24,802	28,186
„ (½ boxes)	17	30
„ (¾ boxes)	3,368	.....
Yakamines (boxes)	156	135
Plums (boxes)	10,892	13,760
Prunes (boxes)	6,492	10,478
Peaches (boxes)	54,716	98,717
Apricots (boxes)	15,401	27,502
Nectarines (boxes)	.....	22
Quince (boxes)	30	72
Cherries (boxes)	6,387	8,607
California oranges (boxes)	133,393	178,423
Japanese oranges (boxes)	235,432	153,183
„ „ (shipped out)	113,117	83,330
Chinese oranges (boxes)	275	333
Tangerines (boxes)	.....	50
Lemons (boxes)	30,553	27,657

APPENDIX No. 8—*Continued.*

MEMORANDUM OF IMPORTED FRUIT, ETC., INSPECTED AT ALL PORTS OF ENTRY IN B.C.—*Continued.*

	1920.	1921.
Marmalade oranges (boxes)	.....	1,693
Grapefruit (boxes)	18,602	17,561
Limes (boxes)	1	.....
Pineapples (boxes)	55	490
Pomeloes (boxes)	406	1,122
Persimmons (boxes)	430	156
Pomegranates (boxes)	302	187
Tomatoes (boxes)	17,432	10,936
Peppers (boxes)	2,296	916
Egg-plants (boxes)	194	107
Potatoes (tons)	9,812	203
Sweet potatoes (tons)	350	316
Yams (tons)	61	60
Taro (tons)	113	109
Onions (crates)	2,400	.....
Rice (tons)	22,913	14,629
Corn (tons)	11,265	12,229
Beans (tons)	4,986	3,065
Peas (tons)	784	403
Peanuts (tons)	1,819	1,511
Walnuts (tons)	313	810

APPENDIX No. 9.

MEMORANDUM OF IMPORTED FRUIT, POTATOES, ETC., CONDEMNED AT ALL PORTS OF ENTRY IN BRITISH COLUMBIA.

	1920.	1921.
Apples (boxes)	2,736	1,718
„ (½ boxes)	20	49
Crab-apples (boxes)	10	38
„ (½ boxes)	.....	2
Pears (boxes)	897	2,838
„ (½ boxes)	.....	28
Plums (boxes)	116	561
Peaches (boxes)	2,592	1,028
Quince (boxes)	.....	1
Cherries (boxes)	12	235
California oranges (boxes)	1,324	432
Japanese oranges (boxes)	.....	16
Grapefruit (boxes)	45	41
Pineapples (boxes)	10	.....
Tomatoes (boxes)	173	1
Peppers (boxes)	.....	12
Potatoes (tons)	186	4
Sweet potatoes (crates)	1	16
Walnuts (lb.)	11,375	1,925
Onions (crates)	257	.....
Peas (lb.)	1	.....
Corn (tons)	40	.....

APPENDIX No. 10.

MEMORANDUM OF IMPORTED RICE, BEANS, PEAS, CORN, ETC., INSPECTED AT VANCOUVER.

	1921. Tons.	1920. Tons.
80,283 50-lb. sacks rice		
112,067 100-lb. „		
1,768 120-lb. „		
1,000 200-lb. „		
2,000 220-lb. „	12,533	16,561
17,740 44-lb. mats		
169,384 50-lb. „		
123,467 lb. bulk rice		
1 20-lb. sacks beans		
2,399 50-lb. „		
58,497 100-lb. „	3,025	4,899
449 200-lb. „		
420 lb. bulk beans		
13 50-lb. sacks peas		
1,805 100-lb. „		
6 135-lb. „		
29 140-lb. „		
1,330 180-lb. „	298	685
50 190-lb. „		
808 200-lb. „		
360 lb. bulk peas		
147 100-lb. sacks popcorn		
15 150-lb. „		
13 156-lb. „		
1,600 lb. bulk popcorn	9,208	8,168
2 125-lb. sacks corn		
18,395,312 lb. bulk corn		
3,014,717 lb. peanuts	1,507	1,811
1,618,582 lb. walnuts	809	311
The following were fumigated:—		
1,884 50-lb. sacks rice	48	89
20 100-lb. „		
52 50-lb. sacks beans	12	1
229 100-lb. „		
91 100-lb. sacks peas	4	2
113,995 lb. peanuts	56	36
104,035 lb. walnuts	52	.....
1,450 empty mats (3,600 in 1920).		
1,745 „ sacks (455 in 1920).		
50 cases pineapples.		
48 nutmegs.		
3,180 lb. chestnuts.		
2 bales corn-husks in 1920.		
15 tons wheat in 1920.		

APPENDIX No. 11.

MEMORANDUM OF IMPORTED RICE, BEANS, PEAS, CORN, ETC., CONDEMNED AT VANCOUVER.

	1920.	1921.
Walnuts (lb.)	1,375	1,925

APPENDIX No. 12.

MEMORANDUM OF IMPORTED RICE, BEANS, PEAS, ETC., INSPECTED AT VICTORIA.

	1920.	1921.
Rice (tons)	6,350	2,091
Corn (tons)	2,563	2,117
Beans (tons)	32	39
Peas (tons)	1	4
Peanuts (tons)	6	1
Walnuts (lb.)	100	.....
The following were fumigated:—		
Rice (tons)	150	53
Empty gunny-sacks (lb.)	.....	1,000
Chestnuts (lb.)	.....	500
Corn (tons)	15	.....
Peanuts (tons)	2	.....
Oilcake	86	.....

APPENDIX No. 13.

MEMORANDUM OF IMPORTED FRUIT, POTATOES, ETC., INSPECTED AT VANCOUVER (INCLUDING THOSE CONDEMNED).

	1920.	1921.
Apples (boxes)	75,643	76,915
„ (½ boxes)	79	230
„ (barrels)	2	.....
Crab-apples (boxes)	10	39
„ (½ boxes)	.....	3
Pears (boxes)	23,722	24,484
„ (½ boxes)	17	30
„ (¾ boxes)	3,368	.....
Plums (boxes)	7,894	10,643
Prunes (boxes)	5,930	8,258
Peaches (boxes)	40,303	74,553
Cherries (boxes)	4,821	6,636
Apricots (boxes)	13,949	22,048
Quince (boxes)	23	32
Yakamines (boxes)	86	115
Nectarines (boxes)	.....	22
Tangerines (boxes)	.....	50
California oranges (boxes)	100,218	123,276
Japanese oranges (boxes)	211,175	127,204
„ „ (shipped out)	113,117	83,330
Marmalade oranges (boxes)	.....	1,693
Chinese oranges (boxes)	275	333
Lemons (boxes)	23,095	20,503
Grapefruit (boxes)	15,578	13,830
Pomeloes (boxes)	124	576
Limes (boxes)	1	.....
Pineapples (boxes)	40	414

APPENDIX No. 13—*Continued.*

MEMORANDUM OF IMPORTED FRUIT, ETC., INSPECTED AT VANCOUVER—*Continued.*

	1920.	1921.
Persimmons (boxes)	349	146
Pomegranates (boxes)	244	137
Tomatoes (boxes)	15,693	9,474
Peppers (boxes)	1,374	371
Egg-plants (boxes)	155	55
Potatoes (crates)	.....	5
„ (tons)	7,778	74
Sweet potatoes (crates)	5,741	5,107
Yams (crates)	936	847
Taro (crates)	2,006	1,759
Onions (crates)	1,200	.....

APPENDIX No. 14.

MEMORANDUM OF IMPORTED FRUIT, POTATOES, ETC., CONDEMNED AT VANCOUVER.

	1920.	1921.
Apples (boxes)	1,785	1,676
„ (½ boxes)	.....	49
Crab-apples (boxes)	10	38
„ (½ boxes)	.....	2
Pears (boxes)	894	2,833
„ (½ boxes)	.....	28
Plums (boxes)	101	561
Peaches (boxes)	20	1,028
Cherries (boxes)	12	235
Quince (boxes)	.....	1
California oranges (boxes)	.....	198
Grapefruit (boxes)	.....	13
Tomatoes (boxes)	168	1
Peppers (boxes)	.....	10
Potatoes (lb.)	355,344	40
Sweet potatoes (crates)	1	16
Onions (crates)	257	.....

APPENDIX No. 15.

MEMORANDUM OF IMPORTED NURSERY STOCK INSPECTED AT VANCOUVER.

Standard fruit-trees—	1920.	1921.
Apple	44,094	53,541
Crab-apple	210	47
Pear	13,649	7,399
Cherry	8,009	17,266
Plum	3,022	5,961
Prune	5,346	6,627
Peach	7,885	7,430
Quince	160	51
Nectarine	33	16
Apricot	4,261	9,574
Fig	8	68
Persimmon	.....	1

APPENDIX No. 15—*Continued.*

MEMORANDUM OF IMPORTED NURSERY STOCK INSPECTED AT VANCOUVER—*Continued.*

	1920.	1921.
Nut-trees—		
Walnut	609	671
Pecan	.....	8
Filbert	31	713
Chestnut	29	400
Almond	39	63
Seedlings, grafts, and scions—		
Fruit seedlings	298,549	655,088
Ornamental seedlings	4,483	700
Grafts	192	4,748
Scions	4,300	6,929
Small-fruit bushes and plants—		
Cranberry-vines	.....	2,000
Grape-vines	6,020	2,818
Currant-bushes	13,676	2,337
Blueberry-bushes	.....	17
Gooseberry-bushes	4,080	4,797
Raspberry and loganberry	172,010	.....
Raspberry-canes	.....	82,508
Loganberry-canes	.....	66,350
Blackberry-canes	8,931	5,908
Strawberry-plants	855,750	45,244
Miscellaneous—		
Ornamental trees, etc.	30,264	48,120
Rose-bushes	21,593	93,617
Plants (herbaceous)	26,503	37,681
Roots and bulbs	1,150,266	1,024,283
Totals	2,684,002	2,189,981

APPENDIX No. 16.

MEMORANDUM OF IMPORTED NURSERY STOCK CONDEMNED AT VANCOUVER.

	1920.	1921.
Standard fruit-trees—		
Apple	3,458	1,198
Crab-apple	42	2
Pear	1,059	1,143
Cherry	119	279
Plum	210	42
Prune	262	46
Peach	1,456	324
Nectarine	.....	1
Apricot	99	53
Nut-trees—		
Filbert	2	236
Chestnut	12	74
Almond	.....	2
Walnut	2	.....
Seedlings and grafts—		
Fruit seedlings	1,591	618
Ornamental seedlings	100	.....
Grafts	12	.....

APPENDIX No. 16—*Continued.*

MEMORANDUM OF IMPORTED NURSERY STOCK CONDEMNED AT VANCOUVER—*Continued.*

	1920.	1921.
Small-fruit bushes aand plants—		
Cranberry-vines	.....	18
Grape-vines	1,181	147
Currant-bushes	149	1,149
Blueberry-bushes	.....	3
Gooseberry-bushes	188	294
Raspberry and loganberry	643	.....
Raspberry-canes	.....	6,947
Loganberry-canes	.....	6
Blackberry-canes	239	31
Strawberry-plants	8,775	50
Miscellaneous—		
Ornamental trees, etc.	338	309
Rose-bushes	58	36
Plants (herbaceous)	162	181
Roots and bulbs	26,488	670
Totals	46,645	13,859

APPENDIX No. 17.

MEMORANDUM OF VEGETABLES, FRUIT, NUTS, ETC., FOR WHICH NO CERTIFICATES WERE ISSUED.

	1920, Crates.	1921, Crates.
Artichokes	79	57
Asparagus	2,699	3,114
Beets	580	30
Beans (green)	93	158
Brussels sprouts	263	102
Cabbage	15,178	5,307
Celery (140 condemned)	1,963	3,735
Cucumbers	632	699
Carrots	1,132	1,244
Corn (13 condemned)	62	21
Cauliflower	4,564	3,084
Caladium	.....	27,700
Chicory	2	2
Chard	.....	12
Cinnamon-bark	.....	52,100
Cloves	.....	670
Caltrops	.....	1,200
Carambolas	.....	1,000
Dill-flowers	.....	300
Escarolles	.....	1
Endives	.....	1
Gye Choy	5	85
Ginger-root	2,000	61,600
Geet Gwah	.....	13
Garlic	1,043	8,900
Hops	.....	2,885
Horse-radish	.....	459
Kye Choy	2	4
Lettuce	12,837	14,377
Lentils	3,500	3,614

APPENDIX No. 17—*Continued.*

Memorandum of Vegetables, Nuts, etc., for which no Certificates were issued—*Continued.*

	1920, Crates.	1921, Crates.
Lung Man	.....	1,000
Lily-root	.....	2,400
Mint	50	4
Maize-husks	.....	300
Nutmegs	36	805
Onions	27,168	7,323
Olives	10	.....
Parsley	196	104
Peppers	3	.....
Peas (split)	.....	41,082
„ (green)	947	101
Radishes	418	295
Rutabagas	.....	170
Rhubarb	2,084	4,046
Spinach (50 condemned)	1,349	1,636
Squash	358	55
Seed (miscellaneous)	714,600	307,447
Sue Choy	582	321
Se Gu	.....	10,900
Sugar-cane	63	18,621
Salsify	.....	3
Sing Gwah	.....	6
Turnips	855	4,132
Spelts or emmer	.....	100
Bak Choy	50	61
Tapioca	4	.....
Wheat	247,651	.....
Bulbs	1,005	2,000
Burdock-root	2,300	.....
Vegetables	26	.....
Leeks	33	.....
Parsnips	25	.....
Pumpkins	2	.....
Potatoes	791	.....
Water-caltrops	.....	1,200
Water-chestnuts	2,400	32,100
Water-lily	9,400	73,340
White nuts	2,300	4,100
Watercress	.....	½
Almonds	3,319	8,730
Brazil nuts	6,596	3,370
Chestnuts	10,500	8,725
Cocoa-beans	182,990	55,925
Filberts	1,332	83
Lychee nuts	.....	12,800
Lotus nuts	.....	400
Peanuts	2,033,500	1,300
Pine nuts	.....	1,910
Pecan nuts	500	900
Apples (dried)	188	11,071
Bananas	47,649	37,850
Cocoanuts (2,800 condemned)	1,907	17,400
Currants (dried)	.....	92,000
Cranberries	1,818	72,400

APPENDIX No. 17—*Continued.*

MEMORANDUM OF VEGETABLES, NUTS, ETC., FOR WHICH NO CERTIFICATES WERE ISSUED—*Continued.*

	1920, Crates.	1921, Crates.
Figs	145	2,500
Foo Gwah	6	11
Grapes	18,402	23,373
Gooseberries	21	34
Pears (evaporated)	.....	3,750
Strawberries	5,287	8,908
Blackberry	1	.....
Dates	12	.....
Blueberry	20	.....
Cantaloupes	17,512	14,535
Casabas	6,191	3,910
Melons	5,134	2,957
Watermelons	26,954	38,911
Butternuts	50	.....
Copra-cake	36,800	.....
Walnuts (black)	50	.....
Walnuts	301,791	.....

APPENDIX No. 18.

DISTRICTS IN WHICH HERDS WERE TESTED FOR TUBERCULOSIS.

Places.	Herds.	No. tested.	Rec.	Destroyed.	Quar.
Okanagan and Kootenay.					
Armstrong	63	240	3	3	...
Aldergerth	1	1	...	...	...
Alexandria	2	11	1	1	...
Balfour	2	7	...	...	...
Benton	1	21	...	...	...
Ballicah	1	9	...	...	...
Black Pines	2	4	...	...	...
Creston	2	20	...	...	...
Cranbrook	11	120	11	11	...
Creston Valley	2	47	...	...	...
Crawford Valley	12	30	...	...	...
Canford	1	11	...	...	...
Dot	2	5	...	...	...
Erickson	1	2	...	...	...
Enderby	3	58	...	...	...
Eagle Bay	1	1	...	...	...
Grindrod	1	2	...	...	...
Golden	2	4	...	...	...
Hedley	1	8	...	...	...
Kootenay Bay	2	8	...	...	...
Kelowna	7	7	...	...	...
Kamloops	23	157	2	2	...
Lumby	1	18	...	...	...
Mazama	1	6	...	...	...
Michel	2	6	2	2	...
Notch Hill	1	6	...	...	...
Natal	18	57	6	6	...
Nelson	64	230	23	23	...
Nakusp	11	34	...	...	...
Oyama	2	2	...	...	...
Osoyoos	2	22	1	1	...
Okanagan Landing	4	25	5	5	...
Okanagan Centre	2	3	1	1	...
Penticton	53	73	1	1	...
Carried forward	304	1,255	56	56	...

APPENDIX No. 18—*Continued.*

DISTRICTS IN WHICH HERDS WERE TESTED FOR TUBERCULOSIS—*Continued.*

Places.	Herds.	No. tested.	Rec.	Destroyed.	Quar.
Brought forward	304	1,255	56	56	...
Okanagan and Kootenay—Continued.					
Port Crawford	9	19	...	...	...
Peachland	8	9	...	...	...
Procter	2	8	...	...	...
Princeton	1	4	1	1	...
Queen's Bay	1	1	...	...	...
Rutland	1	1	...	...	...
Revelstoke	2	23	...	...	...
Salmon Arm	10	62	1	1	...
Salmon River	2	12	...	...	...
Summerland	12	21	...	...	...
Tappen	1	3	...	...	...
Willow Point	13	59	...	...	...
Westbank	2	8	...	...	...
West Summerland	2	21	...	...	...
Vallican	2	9	...	...	...
Vernon	3	9	...	...	...
Lansdowne	2	15	...	...	...
Fentry	1	21	...	...	...
Totals	378	1,560	58	58	...
Vancouver Island.					
Alberni	8	19	2	2	...
Cowichan District—					
Cowichan	48	338	2	2	...
Chemainus	6	82	6	6	...
Crofton	1	8	...	...	...
Glenora	6	29	3	3	...
Maple Bay	7	59	...	...	...
Cobble Hill	11	57	4	4	...
Hillbank	1	2	...	...	...
Mount Sicker	1	2	...	...	...
Cowichan Station	4	21	1	1	...
Westholme	3	10	...	...	...
Tzouhalem	2	3	...	...	...
Duncan	20	57	4	3	1
Sahtlam	14	60	...	...	...
Somenos	39	170	1	1	...
Tyee	1	4	...	...	...
Tansor	5	16	...	...	...
Quamichan	7	43	...	...	...
Comox	11	71	5	5	...
Courtenay	9	80	3	3	...
Nanaimo District.	71	340	75	75	...
Extension	24	133	24	24	...
East Wellington	10	54	5	5	...
Nanaimo River	12	153	10	9	1
Northfield	2	15	...	...	...
North Wellington	10	69	...	...	...
South Wellington	18	136	5	5	...
Dashwood	1	2	...	...	...
Departure Bay	1	1	...	...	...
Chase River	7	22	2	2	...
Cedar	36	302	...	...	...
Cassidy	1	14	...	...	...
Boat Harbour	1	9	...	...	...
Carried forward	398	2,383	152	150	2

APPENDIX No. 18—*Continued.*

DISTRICTS IN WHICH HERDS WERE TESTED FOR TUBERCULOSIS—*Continued.*

Places.	Herds.	No. tested.	Rec.	Destroyed.	Quar.
Brought forward	398	2,383	152	150	2
Vancouver Island—Continued.					
Gabriola	1	4	...	...	...
Parksville and Nanoose Bay	7	42	...	...	...
Metchosin and Sooke	52	320	10	9	1
Gulf Islands	56	180	8	8	...
Saanich	261	1,705	141	129	12
Victoria	68	202	16	15	1
Totals, Vancouver Island	843	4,836	327	311	16
Mainland (Lower Fraser).					
Albion	5	32	1	1	...
Agassiz	21	253	4	4	...
Abbotsford	3	16	7	7	...
Aldergrove	7	23	...	...	...
Barnston Island	11	139	...	...	...
Bowen Island	2	17	1	1	...
Burnaby	106	429	22	22	...
Coquitlam	19	332	31	31	...
Cloverdale	94	1,164	78	58	19
Chilliwack	227	2,108	57	57	...
Delta	48	788	61	55	6
Dewdney	4	61	...	...	...
Hammond	78	527	95	95	...
Haney	13	72	10	8	2
Kamloops	1	51	...	...	...
Kingcome Inlet	2	33	...	...	...
Langley	85	1,059	25	24	1
Lulu Island and Sea Isle	147	1,278	112	110	2
Ladner	3	50	...	...	...
Lund	1	11	5	5	...
Matsqui	65	569	9	8	1
Mission	3	24	1	1	...
Pitt Meadows	17	206	3	3	...
Port Moody	13	27	1	1	...
Powell River	6	22	11	11	...
Ocean Falls	1	21	7	7	...
Squamish	25	94	...	...	...
Seechelt	1	5	...	...	...
Surrey	64	335	5	3	2
Upper Sumas	27	455	12	12	...
Vancouver	190	395	20	19	1
North Vancouver	17	117	2	2	...
South Vancouver	13	99	1	1	...
Point Grey	18	76	9	9	...
Westminster	76	153	10	10	...
Whonnock	1	21	12	12	...
Yale	14	55	...	...	...
Smithers	3	28	...	...	...
Vanderhoof	6	80	...	...	...
Prince George	21	71	...	...	...
	1,458	11,296	612	577	34
Summary.					
Mainland (Lower Fraser)	1,458	11,296	612	577	34
Okanagan and Kootenay	378	1,560	58	58	...
Vancouver Island	843	4,836	327	311	16
Totals	2,671	17,692	997	946	50

APPENDIX No. 19.

Seed-potato Certification Work.

Fairfield Island, Chilliwack (Local Seed), 1921.

Field.	Variety.	Leaf-roll.	Mosaic (severe).	Mosaic (slight).	Black-leg (Crop).	Wilt.	Variation in Type of Plant.	Impurities.	Tubers.			
									Late Blight.	Common Scab.	Rhizoctonia.	Stem-end Discoloration.
		Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.
1	Netted Gem	....	....	....	....	4.00	....	....	...	....	....	....
2	"	....	....	0.25	....	1.50	....	0.25	....	....	10.00	....
3	"	....	....	1.00	.. .	....	....	....	50.00	....	....	....
4	"	....	....	....	....	....	....	0.50	(*a*)	(*a*)	(*a*)	(*a*)
5	"	....	....	0.25	....	....	0.25	0.50	1.00	....	18.00	....
6	"	....	....	....	....	....	....	....	12.00	....	13.00	....
7	"	0.50	....	....	....	1.00	....	....	....	....	....	4.00
8	"	....	....	0.25	....	1.50	....	0.75	(*a*)	(*a*)	(*a*)	(*a*)
9	"	0.25	....	0.75	....	....	....	..	3.00	....	....	....
10	"	....	.. .	....	....	1.00	....	....	17.00	....	2.00	1.00
11	"	....	....	....	....	....	....	0.25	....	....	22.00	....
12	"	....	....	....	....	...	0.25	6.25	5.00	....	32.00	....
13	"	0.50	....	....	3.5	....	....	1.00	18.00	1.00	2.00	2.00
14	"	....	....	0.25	....	....	....	....	(*a*)	(*a*)	(*a*)	(*a*)
15	"	....	....	1.50	....	5.10	....	....	(*a*)	(*a*)	(*a*)	(*a*)
16	"	....	....	0.50	....	0.50	....	0.50	(*a*)	(*a*)	(*a*)	(*a*)
17	"	....	....	....	....	2.00	....	0.50	(*a*)	(*a*)	(*a*)	(*a*)
18	"	....	....	....	....	1.00	....	....	3.00	....	3.00	14.00
19	"	....	....	0.50	....	....	....	0.25	0.50	....	....	....
20	"	0.50	....	0.50	...	0.25	....	...	6.00	....	7.00	....
21	J. Royal	0.25	....	0.25	....	1.00	....	0.25	....	....	3.00	....
22	"	0.25	....	1.25	....	0.50	....	0.50	8.00	....	75.00	....
23	"	....	....	2.50	....	....	....	3.00	....	23.00	6.00	....
24	"	0.50	....	1.25	....	....	....	....	(*a*)	(*a*)	(*a*)	(*a*)
25	"	0.25	0.50	2.25	....	0.25	....	....	....	....	....	....
26	"	....	0.50	1.00	....	....	....	....	(*a*)	(*a*)	(*a*)	(*a*)
	Average for diseased fields	0.37	0.50	0.89	305	1.50	0.25	11.11	11.22	12.00	16.08	5.25

Sooke (Local Seed), 1921.

1	Up-to-date	2.00	....	0.50	....	....	....	....	(*a*)	(*a*)	(*a*)	(*a*)
2	"	4.00	....	0.50	....	0.50	....	....	(*a*)	(*a*)	(*a*)	(*a*)
3	"	5.00	....	...	....	....	4.0	1.0	(*a*)	(*a*)	(*a*)	(*a*)
4	"	6.50	....	....	....	....	....	....	(*a*)	(*a*)	(*a*)	(*a*)
5	"	4.00	....	....	....	2.00	....	....	(*a*)	(*a*)	(*a*)	(*a*)
6	"	1.50	...	....	....	....	....	....	(*a*)	(*a*)	(*a*)	(*a*)
	Average for diseased fields	3.83	....	0.50	....	1.25	4.0	1.0	....	....	....	....

(*a*) No inspection.

APPENDIX No. 19—*Continued.*

SEED-POTATO CERTIFICATION WORK—*Continued.*

Keating (Local Seed), 1921.

Field.	Variety.	Leaf-roll.	Mosaic (severe).	Mosaic (slight).	Black-leg (Crop).	Wilt.	Variation in Type of Plant.	Impurities.	Tubers.			
									Late Blight.	Common Scab.	Rhizoctonia.	Stem-end Discoloration.
1	Up-to-date	3.20	0.50	1.75	....	....	0.75	....	(a)	(a)	(a)	(a)
2	"	2.50	...	....	....	2.00	....	....	(a)	(a)	(a)	(a)
3	Netted Gem	5.60	1.50	....	....	....	....	....	(a)	(a)	(a)	(a)
	Average for diseased fields	3.76	0.66	1.75	....	2.00	0.75	....	(a)	(a)	(a)	(a)

Kamloops (Local Seed), 1921.

1	Ormandy	1.50	....	5.5	....	0.50	....	....	(a)	(a)	(a)	(a)
2	"	0.25	0.25	....	....	....	....	....	....	2.0	10.0	....
3	"	0.25	0.56	....	....	1.25	....	....	....	....	9.0	....
	Average for diseased fields	0.66	0.37	5.5	....	0.87	....	....	....	2.0	9.5	....

Errington (Local Seed), 1921.

1	Up-to-date	0.25	....	....	....	....	....	....	....	....	....	15.00
2	"	3.00	....	....	....	....	....	....	....	....	....	8.00
3	"	0.25	....	....	....	....	....	....	....	....	....	3.00
4	Carmen No. 1	....	....	2.5	....	....	....	3.75	(a)	(a)	(a)	(a)
	Average for diseased fields	1.17	....	2.5	....	....	....	3.75	....	....	....	8.66

Victoria (Local Seed), 1921.

1	Raleigh	0.75	0.25	....	....	....	0.50	5.10	(a)	(a)	(a)	(a)
2	"	3.70	....	....	....	0.25	0.25	2.75	(a)	(a)	(a)	(a)
3	"	3.00	....	....	....	....	....	3.70	(a)	(a)	(a)	(a)
4	"	5.00	....	....	....	0.50	...	1.20	(a)	(a)	(a)	(a)
5	"	2.00	....	0.25	....	....	....	5.50	(a)	(a)	(a)	(a)
6	Carmen No. 1	1.00	....	....	....	....	....	5.00	(a)	(a)	(a)	(a)
	Average for diseased fields	2.94	0.25	0.25	....	0.37	0.37	3.87	....	....	....	....

(a) No inspection.

Ellison (Imported Certified Seed), 1921.

1	Netted Gem	....	....	....	....	0.25	....	....	(a)	(a)	(a)	(a)
2	"	....	....	....	....	....	....	....	(a)	(a)	(a)	(a)
3	"	....	....	....	....	0.25	....	....	....	....	....	....
4	Irish Cobbler	0.25	....	....	....	0.25	0.50	..	(a)	(a)	(a)	(a)
5	"	....	....	....	1.00	2.50	....	....	....	....	....	....
6	"	....	....	....	....	....	....	....	....	2.00	5.00	....
7	"	....	....	....	0.50	....	....	....	(a)	(a)	(a)	(a)
8	"	0.25	....	....	....	0.25	....	0.50	....	....	3.00	....
9	"	....	....	....	....	....	....	....	(a)	(a)	(a)	(a)
10	"	....	....	....	....	....	....	....	....	6.00	7.00	3.00
11	"	....	....	....	....	....	....	....	....	....	16.00	1.00
12	"	....	....	....	....	....	....	....	....	14.00	1.00	....
13	"	0.25	....	....	....	....	....	....	....	....	3.00	....
14	"	....	....	....	0.50	....	....	....	....	9.00	21.00	....
15	Green Mountain	....	....	....	0.50	....	....	....	(a)	(a)	(a)	(a)
16	"	....	....	....	....	0.50	....	....	....	50.00	....	....
17	"	....	....	....	....	....	....	....	....	1.00	....	....
18	"	....	....	....	....	....	....	....	(a)	(a)	(a)	(a)
19	"	....	....	....	....	....	....	....	....	3.00	4.50	....
20	"	....	....	....	....	....	....	....	....	1.50	....	....
21	"	....	....	....	....	....	....	....	....	20.00	....	....
22	"	....	....	....	....	....	....	....	(a)	(a)	(a)	(a)
23	"	....	....	....	....	2.00	....	....	....	....	3.00	....
24	"	....	....	....	....	....	....	....	....	25.00	....	....
	Average for diseased fields	0.25	....	....	0.62	0.85	0.50	0.50	....	13.15	7.05	2.00

Saltspring Island (Local Seed), 1921.

1	Gold Coin	....	....	....	1.0	....	....	5.5	(a)	(a)	(a)	(a)
2	Jones' White	0.25	2.00	4.25	....	....	....	....	(a)	(a)	(a)	(a)
	Average for diseased fields	0.25	2.00	4.25	1.0	....	....	5.5	....	....	....	....

Courtenay (Local Seed), 1921.

1	Burbank	....	....	1.00	....	....	....	....	....	....	....	....
2	"	....	....	1.75	....	....	0.75	0.25	....	....	17.00	....
3	"	....	....	1.00	....	....	....	....	....	....	....	....
4	"	....	....	0.75	....	....	....	0.25	....	....	....	....
5	"	....	....	....	0.50	....	....	....	....	....	11.0	....
6	Up-to-date	....	....	....	1.25	1.75	0.25	....	....	....	....	10.00
7	"	....	....	....	....	0.50	....	....	....	....	....	7.00
8	"	0.25	....	....	....	0.25	....	....	....	....	5.00	2.00
9	"	....	....	....	....	....	....	....	....	....	....	6.00
10	"	....	0.25	....	....	1.25	....	....	....	....	....	....
11	"	1.20	....	0.25	....	0.75	....	....	....	....	2.00	10.00
12	"	0.25	....	0.25	....	....	0.50	....	....	....	37.00	....
13	"	0.25	....	....	....	....	....	....	....	1.00	4.00	....
	Average for diseased fields	0.48	0.25	0.83	0.87	0.90	0.50	0.25	....	1.00	12.66	7.10

(a) No inspection.

N.B.—The reason for no tuber inspection being made in several instances, is because the crop was rejected at the first or second field inspection on account of too much disease being present or because the crop was lacking in vigour.

APPENDIX No. 20.

STATEMENT OF KAMLOOPS BULL-SALE, MARCH 22ND AND 23RD, 1921.

Receipts.

Balance from 1920 sale	$ 102 33
Stock sold, 97 head for	19,722 50
Membership fee to B.C.S.B.A., 1921	25 00
Entry fees	276 00
Commission on sales	591 65
Freight, incoming	703 75
Freight, outgoing	401 35
Feed	16 95
Straw for stables	58 50
Loading charges	72 00
Exchange on cheques	15 05
Advertising in catalogue	354 00
Transferring pedigrees	54 00
Special prizes	85 00
Halter supplied J. R. Christie	50
Received from Banquet Committee	26 50
Received from 1919 Armstrong Sale	8 11
Cash retained in connection with bull sold by Parker, Turnbull & Murray	35 00
	$22,548 19

Expenditures.

Stock bought, 97 head for	$19,687 50
Advertising	181 03
Printing	52 61
Catalogue	262 55
Freight, incoming	752 95
Freight, outgoing	390 66
Feed	20 95
Straw	67 70
Labour	112 30
Exchange on cheques	15 41
Stamps	17 50
Telegrams and long-distance calls	16 75
Photos of stock	5 00
Licence	10 00
Transferring pedigrees	65 00
Special prizes	80 00
H. E. Church (hot water for stock)	10 00
Electric lighting in hall	2 75
Engraving on cups	6 00
Express on cups	1 00
Membership fees to Victoria	25 00
Sundries (ribbons, tags, paste)	12 90
Repairing and fixing up stables	146 76
Auctioneers	325 00
	$22,267 32

Account receivable (advertising)	$12 00	
Account receivable (extra on pedigree)	4 75	
		$ 16 75
Cash on hand		280 87
Outstanding cheques		5 00

APPENDIX No. 21.

TENTH INTERNATIONAL EGG-LAYING CONTEST.

The Tenth International Egg-laying Contest was held under the auspices of the Poultry Division, Provincial Department of Agriculture, at the Exhibition Grounds, Victoria, B.C., from October 22nd, 1920, to September 21st, 1921, a period of eleven months. The total number of eggs laid is as follows:—

Pen No.	Name and Address.	Breed.	Total Eggs.
	Class 1.—Light-weight Varieties.		
29, 30	W. Bradley, Langford (First prize, $15)	White Leghorns	416
11, 12	F. E. Pullen, Whonnock (Second prize, $10)	Anconas	409
39, 40	Mrs. A. Easton, Duncan (Third prize, $5, and second best laying bird, Class 1, $5)	White Leghorns	407
19, 20	E. J. White, 29th Ave. W., Vancouver (Fourth prize, *Canadian Poultry Review* bronze medal, and best laying bird, Class 1, $7.50)	,,	406
35, 36	J. C. Butterfield, Turgoose P.O.	,,	400
15, 16	A. R. Lowe, Lake Hill P.O.	,,	390
25, 26	P. E. Wilkinson, R.M.D. 1, Turgoose	,,	379
23, 24	R. A. King, Mission City	,,	375
37, 38	H. A. Ismay, Box 117, Victoria	,,	373
27, 28*	W. M. Alcorn, Port Hammond	,,	372
13, 14	T. S. P. Buckle, R.M.D. 1, Turgoose	,,	371
7, 8	R. Dunn, Crescent P.O.	,,	371
31, 32	J. Corcoran, 14th Ave. E., Vancouver	,,	367
3, 4	W. Williams, R.M.D. 4, Victoria	,,	361
17, 18	H. A. Hincks, Langford	,,	360
21, 22	W. & F. M. Tozer, Milner	,,	358
9, 10*	A. H. Anderson, Port Hammond	,,	329
5, 6	H. Perrett, Strawberry Hill	,,	316
33, 34	J. J. Dougan, Cobble Hill	,,	288
1, 2	J. O. Thackeray, R.R. 2, Chilliwack	,,	272
	Total		7,320
	Class 2.—Heavy-weight Varieties.		
3, 4	J. Reade, Cowichan Station (First prize, $15, and second best laying bird, Class 2, $5)	White Wyandottes	412
37, 38	Dean Bros., Keating (Second prize, $10)	,,	410
1, 2	J. S. Baiss, Cobble Hill (Third prize, $5, and best laying bird, Class 2, $7.50)	,,	397
33, 34	B. P. Darnell, Royal Oak (Fourth prize, *Canadian Poultry Review* bronze medal)	Single Comb Reds	367
19, 20	A. R. Hooper, Skinner Street, Victoria	White Wyandottes	362
9, 10	Major Brooks, Langford	,,	359
17, 18	Mrs. C. P. Welch, Port Kells	,,	338
11, 12*	E. Greenwood, Box 928, Victoria	Single Comb Reds	333
27, 28	F. J. Deveson, Lake Hill P.O.	,,	326
7, 8	J. H. Barnsby, Whonnock	White Wyandottes	320
35, 36	A. Atkinson, Box 181, Nelson	,,	308
23, 24	E. Nugent, Jubilee	,,	296
15, 16	W. H. Catterall, Cordova Bay	,,	285
13, 14	St. Arvan's, Cobble Hill	,,	253
21, 22	A. H. Pain, Colwood	,,	247
39, 40	J. H. Cruttenden, New Westminster	Buff Wyandottes	238
29, 30	C. W. Robbins, Chilliwack	Buff Orpingtons	235
5, 6*	Regan Bros., Cobble Hill	White Wyandottes	226
31, 32	H. E. Waby, Enderby	Barred Rocks	225
25, 26	J. Joyce, Pembroke Street, Victoria	Rose Comb Reds	121
	Total		6,058

* Eggs underweight.

B.C.P.A. diploma winners: Class 1—First, R. A. King; second, E. J. White; third, P. E. Wilkinson. Class 2—First, Dean Bros.; second, J. S. Baiss; third, A. R. Hooper.

APPENDIX No. 22.

TENTH INTERNATIONAL EGG-LAYING CONTEST—INDIVIDUAL LAYING RECORD.

Pen No.	Name and Address.	Breed.	Band 1.	Band 2.	Total Eggs.
	Class 1.—Light-weight Varieties.				
1, 2	J. O. Thackeray, Chilliwack	White Leghorns	63	209	272
3, 4	W. Williams, R.M.D., Victoria	,,	185	176	361
5, 6	H. Perrett, Strawberry Hill	,,	170	146	316
7, 8	R. Dunn, Crescent P.O.	,,	204	167	371
9, 10	A. H. Anderson, Port Hammond	,,	167	162	329
12, 12	F. E. Pullen, Whonnock	Anconas	206	203	409
13, 14	T. S. P. Buckle, Turgoose	White Leghorns	225	146	371
15, 16	A. R. Lowe, Lake Hill P.O.	,,	188	202	390
17, 18	H. A. Hincks, Langford	,,	176	184	360
19, 20	E. J. White, 29th Ave. W., Vancouver	,,	171	235	406
21, 22	W. & F. M. Tozer, Milner	,,	147	211	358
23, 24	R. A. King, Mission City	,,	171	204	375
25, 26	P. E. Wilkinson, Turgoose	,,	188	191	379
27, 28	W. M. Alcorn, Port Hammond	,,	139	233	372
29, 30	W. Bradley, Langford	,,	210	206	416
31, 32	J. Corcoran, 14th Ave. E., Vancouver	,,	183	184	367
33, 34	J. J. Dougan, Cobble Hill	,,	159	129	288
35, 36	J. C. Butterfield, Turgoose	,,	203	197	400
37, 38	H. A. Ismay, Box 117, Victoria	,,	211	162	373
39, 40	Mrs. A. Easton, Duncan	,,	229	178	407
	Total				7,320
	Class 2.—Heavy-weight Varieties.				
1, 2	J. S. Baiss, Cobble Hill	White Wyandottes	158	239	397
3, 4	J. Reade, Cowichan Station	,,	187	225	412
5, 6	Regan Bros., Cobble Hill	,,	108	118	226
7, 8	J. H. Barnsby, Whonnock	,,	137	183	320
9, 10	Major Brooks, Langford	,,	168	191	359
11, 12	E. Greenwood, Victoria	Single Comb Reds	167	166	333
13, 14	St. Arvan's, Cobble Hill	White Wyandottes	108	145	253
15, 16	W. H. Catterall, Cordova Bay	,,	111	174	285
17, 18	Mrs. C. P. Welch, Port Kells	,,	176	162	338
19, 20	A. R. Hooper, 316 Skinner Street	,,	152	210	362
21, 22	A. H. Pain, Colwood	,,	31	216	247
23, 24	R. Nugent, Jubilee	,,	123	173	296
25, 26	J. Joyce, Victoria	Rose Comb Reds	121	...	121
27, 28	F. J. Deveson, Lake Hill	Single Comb Reds	173	153	326
29, 30	C. W. Robbins, Chilliwack	Buff Orpingtons	120	115	235
31, 32	H. E. Waby, Enderby	Barred Rocks	119	116	225
33, 34	P. B. Darnell, Royal Oak	Single Comb Reds	223	144	367
35, 36	A. Atkinson, Nelson	White Wyandottes	147	161	308
37, 38	Dean Bros., Keating	,,	209	201	410
39, 40	J. H. C. Cruttenden, New Westminster	Buff Wyandottes	138	100	238
	Total				6,058

W. H. STROYAN, *Poultryman.*
J. T. TERRY, *Director.*

APPENDIX No. 23.

Tenth International Egg-laying Contest—Summary of Results.

Duration of contest (months)	11
Number of pens	40
Number of birds	80
Number of eggs laid	13,405
Value of eggs laid	$441.24
Cost of feed	$236.72
Profit over cost of feeding	$204.52
Average price of eggs per dozen	$0.39.5
Highest price received per dozen (October 28th)	$0.85
Lowest price received per dozen (June 3rd)	$0.26
Average cost to produce 1 dozen eggs	$0.21.1
Average number of eggs laid per pen	335.1
Average number of eggs laid per bird	167.5
Average cost of food per bird (11 months)	$2.95
Profit over cost of feed per pen	$5.11
Profit over cost of feed per bird	$2.55
Eggs laid by winning pen, Class 1	416
Average per bird, winning pen, Class 1	208
Eggs laid by winning pen, Class 2	412
Average per bird, winning pen, Class 2	206

Comparison between Fifth Contest, eleven months' duration, 1915–16, and Tenth Contest, eleven months' duration, 1920–21:—

	Fifth.	Tenth.
Number of eggs laid per bird	151.5	167.5
Cost of feed per bird	$1.81	$2.95
Profit over cost of feed per bird	2.47	2.55
Average price of eggs	0.32.4	0.39.5
Cost to produce 1 dozen eggs	0.14.3	0.21.1

APPENDIX No. 24.

List of Creameries, Condenseries, and Cheese-factories in British Columbia.

Name.	Manager or Secretary.	P.O. Address.
Burns, P., & Co.	M. R. Silver	Woodland Drive, Vancouver.
" "	G. J. Swanson	Vernon.
Cariboo Co-operative Association	Wm. Couldwell	Quesnel.
Clayburn Creamery	Cooper Seldon Co.	Clayburn.
Comox Creamery Association	R. U. Hurford	Courtenay.
Cowichan Creamery Association	W. Paterson	Duncan.
Cranbrook Creamery		Cranbrook.
Curlew Creamery Co.	H. Henderson	Grand Forks.
" "	H. Jenne	Nelson.
Fraser Valley Milk Producers' Association (head office)	E. G. Sherwood	703 Rogers Bldg., Vancouver.
Fraser Valley Milk Producers' Association	W. K. MacLeod	Chilliwack.
Fraser Valley Dairy	E. G. Sherwood	1170 Hornby St., Vancouver.
Fraser Valley Dairies, Ltd.	G. O. Clark	405 Eighth Ave. W., Vanc.
Kamloops District Creamery Association	Geo. Hay	Kamloops.
Kelowna Creamery Co., Ltd.	O. S. P. Aitkens	Kelowna.
Nanaimo Creamery Association	Jos. Randle	Nanaimo.
Nechako Valley Co-operative Creamery Association	G. H. Outram	Vanderhoof.
Northwestern Creamery, Ltd.	Norton & Snelling	1131 Broad Street, Victoria.
Northern Okanagan Creamery Association	E. G. Archibald	Armstrong.
Revelstoke Creamery Co., Ltd.	J. E. Carman	Revelstoke.

APPENDIX No. 24—*Continued.*

LIST OF CREAMERIES, CONDENSERIES, AND CHEESE-FACTORIES IN BRITISH COLUMBIA—*Continued.*

Name.	Manager or Secretary.	P.O. Address.
Saltspring Island Creamery Association	A. W. Drake	Ganges.
Salmon Arm Creamery Association	R. Karnagel	Salmon Arm.
Spencer, David, Ltd.	L. Burnham	Vancouver.
Vancouver Creamery Co., Ltd.	J. M. Livingstone	15-23 Alexander Street, Vanc.
Vancouver Island Milk Producers' Association	R. Waterhouse	930 North Park St., Victoria.
Vernon Creamery	H. W. Knight	Vernon.
Westminster Ice & Creamery Co., Ltd.	G. W. Grimston	442 Front St., New Westm'ster.
Condenseries.		
The Pacific Milk Co., Ltd., Abbotsford and Ladner	John R. Payne	328 Drake Street, Vancouver.
Cheese-factories.		
Fraser Valley Milk Producers' Association		Sardis.
Ferrara Cheese Manufacturing Co.	A. G. Ferrara	Chilliwack.
Revelstoke Creamery Co., Ltd.	J. L. Carman	Revelstoke.

APPENDIX No. 25.

COW-TESTING ASSOCIATIONS IN BRITISH COLUMBIA, 1921.

Name.	Instituted.	Secretary.	Tester.	Departmental Grant.
Chilliwack	March 17, 1913	Wm. Dusterhoeft, Chilliwack	J. A. Munn	$600 00
Comox	April 23, 1914	John Pritchard, Comox	T. A. Menzies	600 00
Langley-Surrey	June 8, 1914	H. Berry, Langley Prairie	Wm. Egerton	600 00
Richmond	March, 1919	G. E. C. Hooper, Eburne	M. MacGougan / G. C. Newlands	480 00
Kelowna-Vernon	April, 1920	A. W. Cooke, Kelowna	C. Rive	480 00

APPENDIX No. 26.

TESTERS' LICENCES ISSUED UNDER "CREAMERIES AND DAIRIES REGULATION ACT" FOR YEAR 1921.

Name.	Address.
Archibald, E. G.	Armstrong.
Asserlind, H. E. E.	2136 Union Street, Vancouver.
Brooks, F.	1723 Fourth Avenue West, Vancouver.
Bunting, Thos.	Heffley Creek.
Calder, Jas.	882 Hamilton Street, Vancouver.
Carman, J. E.	Revelstoke.
Carradice, F. W.	528 Eleventh Avenue East, Vancouver.
Carroll, W. J.	Courtenay.
Carter, Jas. N.	137 Seventeenth Avenue West, Vancouver.
Chevalley, F.	R.R. No. 1, Sardis.
Clark, F. J.	203 Sixth Avenue East, Vancouver.
Cook, E. W.	1114 Broadway West, Vancouver.
Cooke, E. H.	1813 Morton Apartments, Vancouver.
Craig, J.	930 North Park Street, Victoria.
Deedman, A.	c/o A. P. Slade, Water Street, Vancouver.
Douglas, D. K.	2408 Heather Street, Vancouver.
Drake, A. W.	Ganges.
Dunn, J. S.	Box 473, Nanaimo.

APPENDIX No. 26—*Continued.*

Testers' Licences issued under "Creameries and Dairies Regulation Act"—*Continued.*

Name.	Address.
Egerton, W.	R.M.D. No. 4, Victoria.
Farmer, R. W.	Quesnel.
Fowler, R. S.	Armstrong.
George, H. H. S.	Kamloops.
Hensen, H. M.	Matsqui.
Henderson, H.	Grand Forks.
Henderson, C. A.	Kamloops.
Hooper, W. J.	1001 Pender Street West, Vancouver.
Iwanami, J.	1113 Fort Street, Victoria.
James, D. A.	Courtenay.
Jenne, H. H.	Nelson.
Jenne, R. E.	Grand Forks.
Johnson, Alfred	Vernon.
Karnagel, R.	Salmon Arm.
Kell, Geo.	New Westminster.
Lewarne, A. E.	400 Pender Street East, Vancouver.
Livingstone, J. B.	3241 St. George Street, Vancouver.
Livingstone, J. M.	23 Alexander Street, Vancouver.
Magar, J. A.	Chilliwack.
Matheson, D. W.	Port Haney.
MacLeod, W. K.	Chilliwack.
McAllister, C. W.	1111 Douglas Street, Victoria.
McCormick, T. H.	621 Fourth Street, New Westminster.
McKerricker, W. R.	1924 Fortieth Avenue, South Vancouver.
Menzies, Thos. A.	Sandwick.
Metcalfe, J. F.	3436 Oak Street, Vancouver.
Miller, W. C.	Salmon Arm.
Naud, D.	930 North Park Street, Victoria.
Nelson, C. E.	2144 Twelfth Avenue West, Vancouver.
Newland, C. G.	Colony Farm, Essondale.
Norton, F. H. A.	1311 Broad Street, Victoria.
Randall, J. J.	309 Sixth Avenue, New Westminster.
Patterson, W. L.	3339 Heather Street, Vancouver.
Richardson, D. H.	489 Tenth Avenue, New Westminster.
Rive, Chas.	Palace Hotel, Kelowna.
Rive, Elias	c/o Pacific Milk Co., Abbotsford.
Russell, Geo. F.	110 Maple Avenue, Powell River.
Scott, B. B.	Kamloops.
Sejrup, V. M.	Duncan.
Sellers, J. H.	414 Pender Street East, Vancouver.
Shelly, A. E.	Abbotsford.
Sherwood, E. G.	703 Rogers Building, Vancouver.
Silver, Mark R.	2215 Powell Street, Vancouver.
Swanson, G.	Vernon.
Thomas, S. J.	Kelowna.
Thornbery, G. H.	c/o Department of Agriculture, Victoria.
Turnbull, Miss M.	Kelowna.
Valentin, M.	Kamloops.
Van der Wall, W.	Box 585, Kamloops.
Washington, F. J.	1170 Hornby Street, Vancouver.
Watson, J. B.	Sardis.
Wells, B.	Ladner.
Woods, R. K.	Wildwood Avenue, Victoria.
Young, E.	Kelowna.
West, C. H.	158 Melbourne Street South, Vancouver.

APPENDIX No. 27.

CREAMERY OR DAIRY LICENCES ISSUED UNDER "CREAMERIES AND REGULATION ACT" FOR YEAR 1921.

Name.	Address.
Almonds, Ltd.	400 Pender Street, Vancouver.
Beaconsfield Dairy Co.	905 Twenty-fourth Avenue East, Vancouv'r.
Burns, P., & Co., Ltd.	Woodland Drive, Vancouver.
" "	Vernon.
Caldwell, John	1855 Georgia Street East, Vancouver.
City Dairy & Produce Co., Ltd.	309 Sixth Street, New Westminster.
" " "	414 Pender Street East, Vancouver.
Comox Creamery Association	Courtenay.
Cooper-Seldon Co.	Clayburn.
Cowichan Creamery Association	Duncan.
Crescent Ice Cream, Ltd.	1002 Hastings Street West, Vancouver.
Curlew Creamery Co.	Grand Forks.
" "	Nelson.
East End Dairy	2469 Oxford Street, Vancouver.
Edenbank Creamery Co.	Seventeenth and Ontario, Vancouver.
Ferrara Cheese Co., Ltd.	Chilliwack.
Fraser Valley Milk Producers' Association	"
" " "	Sardis.
Fraser Valley Dairy	1170 Hornby Street, Vancouver.
Fraser Valley Dairies, Ltd.	405 Eighth Avenue West, Vancouver.
Kamloops District Creamery Association	Kamloops.
Kelowna Creamery Co., Ltd.	Kelowna.
Knight, H. W.	Vernon Creamery, Vernon.
Meadowbrook Creamery, A. P. Slade Co.	155 Water Street, Vancouver.
Nanaimo Creamery Association	Nanaimo.
Nechako Valley Co-operative Creamery Association	Vanderhoof.
Northern Okanagan Creamery Association	Armstrong.
Northwestern Creamery, Ltd.	1311 Broad Street, Victoria.
North Vancouver Dairy	135 Fifth Street East, North Vancouver.
Pacific Milk Co., Ltd.	Ladner Branch.
" "	Abbotsford Branch.
Purity Dairy	Seventeenth Avenue and Quebec Street,
Revelstoke Creamery Co., Ltd.	Revelstoke. [South Vancouver.
Royal Dairy Co.	1001 Pender Street West, Vancouver.
" "	1110 Douglas Street, Victoria.
Salmon Arm Creamery Association	Salmon Arm.
Saltspring Island Creamery Association	Ganges.
South Vancouver Creamery Co., Ltd.	537 Twenty-ninth Avenue East, Vancouver.
Spencer, David, Ltd.	Hastings Street West, Vancouver.
Steves, J. M., Dairy Co.	2144 Twelfth Avenue West, Vancouver.
Valley Dairy, Ltd.	1569 Sixth Avenue West, Vancouver.
Vancouver Creamery, Ltd.	15–23 Alexander Street, Vancouver.
Vancouver Island Milk Producers' Association	930 North Park Street, Victoria.
Victoria City Dairy Co., Ltd.	1111 Fort Street, Victoria.
Westminster Ice and Creamery Co., Ltd.	New Westminster.
White Lunch, Ltd.	124 Hastings Street West, Vancouver.

APPENDIX No. 28.

Land owned and leased by Japanese and Chinese in the Province of British Columbia.

	No. of Owners or Lessees.	Total Acreage.	Orchard.	Small-fruit Growing.	Truck-farming.	Dairy-farming.	Mixed Farming.
			Acres.	Acres.	Acres.	Acres.	Acres.
Land owned by Japanese	492	8,385.78	176.00	2,096.21	281.50	80	631.28
Land owned by Chinese	116	5,664.61	14.50	25.81	1,632.93	...	1,228.00
Totals	608	14,050.39	190.50	2,122.02	1,914.43	80	1,859.28
Land leased by Japanese	103	1,781.26	139.00	155.00	560.25	435	236.75
Land leased by Chinese	369	11,087.12	37.50	64.00	8,184.55	...	1,581.00
Totals	472	12,868.38	176.50	219.00	8,744.80	435	1,817.75
Grand total, lands owned and leased	1,080	26,918.77	367.00	2,341.02	10,659.23	515	3,677.03

APPENDIX No. 29.

Provincial Demonstration Apiaries—Rules.

Equipment.

At least two colonies to be kept in Kootenay hive-cases, consisting of the following parts, standard measurements:—

Cover.—Width, 26½ inches, outside measure; length, 29¾ inches, outside measure; depth, 2¾ inches, outside measure.

Stories.—(At least four.) Width, 24¼ inches, outside measure; length, 27½ inches, outside measure; depth, 9¾ inches, outside measure.

Bottom.—(Including extension alighting-board, and entrance-block.) Width, 24¼ inches, outside measure; length, 27½ inches, outside measure; depth, 7¼ inches, outside measure.

Entrance.—Length, 15¼ inches, inside measure; depth, 2 inches, inside measure.

Material for hive-cases, ¾-inch cedar.

Inside Fittings.—At least four ten-frame hive-bodies, with Langstroth frames, and one wire queen-excluder.

Method of Working.

Each colony to be headed by a pure Italian queen, not exceeding 1 year old, if possible.

Queen to be allowed the run of the two bottom stories all the season, the wire queen-excluder being kept on top of the second story.

The supers, consisting of all the stories above the second story, to be extracted when the honey is three-fourths capped over, and the combs then replaced for the storing of further surplus.

A record to be kept, and furnished annually, of the total crop of honey taken from each hive that is used for demonstration purposes.

APPENDIX No. 30.

List of Provincial Demonstration Apiaries.

Fraser Valley.

Situation.	Owner.
Ladner	Mrs. N. McCallan.
Sullivan	Mrs. Margaret Turnbull.
Port Kells	Phibbs & Lawson.
Langley Prairie	J. W. Berry.
Murrayville	E. Chipperfield.
Bradner	Thos. L. Baker.
Abbotsford	F. E. White.
Matsqui	A. W. Finlay.
Huntingdon	J. W. Winson.
Sardis	Donald MacDonald.
Agassiz	Dominion Experimental Station.
Mission	Charles E. Moore.
Whonnock	H. S. Blois.
New Westminster	A. P. Halliday.
Burnaby	George Coe.

Okanagan.

Penticton	John Price.
Kelowna	R. H. Brown.
Rutland	J. F. Roberts.
Armstrong	J. B. Munro.
Monte Creek	Miss A. E. Bostock.

Kootenays.

Creston	John Blinco.
Crawford Bay	W. J. Kidman.
Willow Point	Ian C. Campbell.
Nelson	W. J. Sheppard.
Kaslo	J. W. Cockle.
Castlegar	A. E. Pittaway.
Appledale	B. Munch.
Grand Forks	J. A. Hutton.

APPENDIX No. 31.

SUMMARY OF REPORTS FROM DEMONSTRATION APIARIES.

No.	Place.	Owner.	Number.	Crop.	Increase.
				Lb.	
1	Ladner	Mrs. N. McCallan	5	603	Nil.
2	Sullivan	Margaret Turnbull	4	600	4
3	Port Kells	Phibbs & Lawson	2	190	2
4	Langley Prairie	Mrs. J. W. Berry	2	246	..
5	Murrayville	E. Chipperfield	3	639	1
6	Bradner	Thos. L. Baker	3	630	3
7	Abbotsford	Fred E. White	2	240	..
8	Matsqui S.	A. W. Finlay	4	740	4
9	Huntingdon	J. W. Winson	2	308	..
10	Sardis	Donald MacDonald	2	39	..
11	Agassiz	Dominion Experimental Farm	3	124	..
12	Mission	Chas. E. Moore	2	136	..
13	Whonnock	H. S. Blois	2	120	..
14	New Westminster	A. P. Halliday	2	...	..
15	Burnaby	George Coe	3	225	..
	Totals		41	4,840	14

Total colonies under supervision, 41; total number of pounds surplus honey, 4840; total number of increase, 14; average winter stores left, 55 lb. per colony; average yield of surplus honey per colony, 118 lb; percentage of increase, 33⅓.

APPENDIX No. 32.

ESTIMATED HONEY-CROP, 1921.

District.	Apiaries.	Hives.	Crop.	Average per Hive.
			Lb.	Lb.
Vancouver Island and Gulf Islands.				
Comox	54	216	.....	..
Duncan	77	308	250	1
Gulf Islands	50	175	.....	..
Howe Sound	32	64	120	2
Nanaimo	104	400	7,000	17
Victoria	189	570	22,800	40
Totals	506	1,733	30,170	17
Bulkley Valley.				
Bulkley Valley	11	14	.....	..
Greater Vancouver.				
Burnaby	96	480	4,800	10
Coquitlam	18	131	2,620	20
Kerrisdale	20	95	1,520	16
South Vancouver	52	290	2,900	10
Marpole	19	56	952	17
North Vancouver	56	280	.....	..
Point Grey	18	72	1,440	20
New Westminster	32	160	.....	..
Vancouver City	76	245	.....	..
Totals	387	1,809	14,232	8

APPENDIX No. 32—*Continued.*

ESTIMATED HONEY-CROP, 1921—*Continued.*

District.	Apiaries.	Hives.	Crop.	Average per Hive.
			Lb.	Lb.
Lower Fraser.				
Delta	62	434	11,718	27
Maple Ridge	61	390	9,750	25
Richmond	45	250	4,500	18
Surrey	85	692	26,296	38
Langley	70	326	14,670	45
Matsqui	85	690	49,680	72
Totals	408	2,782	116,614	42
Upper Fraser and Chilliwack.				
Chilliwack	86	367	8,808	24
Kent	20	93	1,395	15
Dewdney	18	145	6,090	42
Mission	52	225	4,050	18
Sumas	65	475	19,950	42
Totals	241	1,305	40,293	30
Okanagan.				
Okanagan	232	1,114	50,130	45
Thompson River	81	388	21,300	55
Totals	313	1,502	71,430	47
Kootenays.				
Slocan Valley	27	118	5,900	50
Kootenay Lake and West Arm	36	90	2,250	25
Nelson	50	146	5,110	35
Arrow Lakes	29	288	8,640	30
Castlegar	9	100	3,000	30
East Kootenay	6	37	925	25
Boundary	22	328	8,200	25
Creston	27	77	2,310	30
Totals	206	1,184	36,335	30
Summary.				
Vancouver Island and Gulf Islands	506	1,733	30,170	17
Bulkley Valley	11	14	.....	..
Greater Vancouver	387	1,809	14,232	8
Lower Fraser	408	2,782	116,614	42
Upper Fraser and Chilliwack	241	1,305	40,293	30
Okanagan	313	1,502	71,430	47
Kootenays	206	1,184	36,335	30
Totals	2,072	10,329	309,074	30

Value of 1921 crop at average wholesale price of 29 cents per pound, $89,631; value of 1921 crop at average retail price of 35 cents per pound, $108,175.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1922.

PROVINCE OF BRITISH COLUMBIA.

LIQUOR CONTROL BOARD.

Statement of Accounts as at September 30th, 1921.

LIQUOR CONTROL

BALANCE-SHEET AS AT

ASSETS.

CASH IN HAND AND IN BANKS		$ 365,672 01
CASH ADVANCES TO COMMISSIONERS, WAREHOUSE MANAGERS, AUDITORS, AND VENDORS		80,128 50
ACCOUNTS RECEIVABLE		3,613 15
STOCK IN HAND PER INVENTORY		1,849,477 20
REAL ESTATE		30,000 00
BUILDINGS	$120,000 00	
Less depreciation	1,000 00	119,000 00
EQUIPMENT	$ 24,459 96	
Less depreciation	1,528 75	22,931 21
FURNITURE AND FIXTURES	$ 10,807 89	
Less depreciation	403 74	10,404 15
UNEXPIRED INSURANCE—		
General	$ 2,791 72	
Fire	18,723 96	21,515 68
		$2,502,741 90

D. R. MACFARLANE,
Chief Accountant.

A. M. JOHNSON,
Chairman.

Victoria, B.C.,
November 22nd, 1921.

BOARD.

SEPTEMBER 30TH, 1921.

LIABILITIES.

PROVINCIAL TREASURY DEPARTMENT, ADVANCES		$1,438,650 82
ACCOUNTS PAYABLE—		
Trade accounts	$313,346 11	
Confiscated liquors	184,753 71	
Furniture from Prohibition Commissioner's Office	976 25	
Permit fees	23,408 50	
		522,484 57
		$1,961,135 39
PROFIT AND LOSS ACCOUNT (UNDIVIDED PROFITS)		541,606 51
		$2,502,741 90

I have examined the accounts of the Liquor Control Board for the period ended September 30th, 1921.

No accounts have been set up covering the claims against transportation companies for loss and damage to goods in transit.

Refunds on licences have been made in accordance with the provisions of section 104 (2) of the "Government Liquor Act," covering licences in force at the passing of the Act in the City of Vancouver, but no provision has been made in the accounts for liabilities under this section.

Subject to the foregoing remarks, I hereby certify that the Balance-sheet appended hereto is properly drawn up and in agreement with the books of the Liquor Control Board as at September 30th, 1921.

A. N. MOUAT, C.A.,

Comptroller-General, Province of British Columbia.

TRADING ACCOUNT FOR THE PERIOD

TO MERCHANDISE PURCHASED			$3,295,560 47
OPERATING COSTS—			
WAREHOUSES—			
Salaries	$ 24,675 39		
Rent	7,493 75		
Insurance	3,767 68		
Telegraph and telephone	335 31		
Light, water, and fuel	166 55		
Alterations and equipment	3,834 18		
Ullage	696 19		
Depreciation	1,778 51		
Sundries	3,484 61		
		$ 46,232 17	
VENDORS—			
Salaries	$ 69,072 11		
Rents	10,534 02		
Insurance	3,622 97		
Telegraph and Telephone	700 93		
Light, water, and fuel	650 79		
Alterations, etc., rented (non-leasehold) premises	16,111 38		
Depreciation	743 64		
Sundries	6,707 65		
		108,143 49	
			154,375 66
HEAD OFFICE EXPENSES—			
Administrative salaries		$ 23,222 04	
Travelling expenses		7,016 66	
Interest on advances		28,605 02	
Rent		1,430 00	
Telegraph and telephone		1,185 95	
Printing and stationery		18,648 96	
Postage		1,835 85	
Legal expenses		239 12	
Bank charges		76 39	
Guarantee bonds expired		167 38	
Taxes (local improvement)		89 74	
Depreciation		410 34	
Sundries		1,429 67	
			84,357 12
			$3,534,293 25
BALANCE TRANSFERRED TO PROFIT AND LOSS ACCOUNT			541,544 94
			$4,075,838 19

JUNE 15TH TO SEPTEMBER 30TH, 1921.

BY LIQUOR SALES		$2,228,918 17	
Less discounts to druggists	$1,713 74		
„ Vendors' breakages	4,213 63		
„ Vendors' shortages	3,477 87		
		9,405 24	
			$2,219,512 93
OTHER INCOME—			
Bank interest		$ 1,923 40	
Premium and exchange		1,570 75	
Rents		2,843 75	
Miscellaneous cash receipts		510 16	
			6,848 06
STOCK ON HAND AS PER INVENTORY			1,849,477 20
			$4,075,838 19

PROFIT AND LOSS ACCOUNT FOR THE

TO SECRET SERVICE EXPENSES	$ 10,598 72	
MAINTENANCE OF PRISONERS	1,661 14	
REFUND OF LICENCES, VANCOUVER	36,338 79	
		$ 48,598 65
BALANCE, NET PROFIT, CARRIED TO BALANCE-SHEET		541,606 51
		$ 590,205 16

A. M. JOHNSON,

Chairman.

PERIOD JUNE 15TH TO SEPTEMBER 30TH, 1921.

BY BALANCE FROM TRADING ACCOUNT		$ 541,544 94
WAREHOUSE LICENCES	$ 48,000 00	
TAXES REALIZED UNDER SECTION 55	660 22	
		48,660 22
		$ 590,205 16

D. R. MACFARLANE,

Chief Accountant.

VICTORIA, B.C.
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1922.

PROVINCE OF BRITISH COLUMBIA

REPORT

OF

THE PROVINCIAL LIBRARY AND ARCHIVES

FOR NINE MONTHS ENDING

SEPTEMBER 30TH, 1921

UNIVERSITY OF ILLINOIS LIBRARY
JAN 8 1923

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1922.

To His Honour WALTER CAMERON NICHOL,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

I have pleasure in transmitting herewith a Report of the Provincial Library and Archives for nine months ending September 30th, 1921.

J. D. MACLEAN,

Provincial Secretary.

Provincial Secretary's Office,

Victoria, B.C., October 26th, 1921.

PROVINCIAL LIBRARY,

VICTORIA, B.C., October 22nd, 1921.

The Honourable J. D. MacLean, M.D., C.M.,

Provincial Secretary, Victoria, B.C.

SIR,—I beg to transmit herewith for presentation to the Legislature the Report of the Provincial Library and Archives covering the period from January 1st to September 30th, 1921.

I have the honour to be,

Sir,

Your obedient servant,

J. FORSYTH,

Provincial Librarian.

PROVINCIAL LIBRARY AND ARCHIVES DEPARTMENT.

VICTORIA, B.C., October 22nd, 1921.

To the Honourable A. M. Manson,
Speaker of the Legislative Assembly
of the Province of British Columbia.

SIR,—I have the honour to submit herewith the Report of the Provincial Library and Archives Department for the nine months ending September 30th, 1921, which shows a substantial increase in business over corresponding periods in previous years.

From the Reference Desk 20,063 volumes were issued; of this number, 185 were borrowed by the Public Libraries Commission to supplement the Travelling Libraries. There were also a number sent to individual inquirers in various districts in the Province.

The work of indexing local daily newspapers is also done at the Reference Desk, and during the period under review 5,344 items were recorded in the newspaper index.

Of 1,719 new books added to the library, 1,432 were catalogued, for which 6,348 cards were made and filed in the card catalogue.

The Cataloguer, in addition to classifying and cataloguing, acts as relief at the Reference Desk, and 265 hours of her time were spent in this way.

The following list of questions which have been dealt with in the Library is indicative of the wide use made of our service, both by members of the Legislature and by officials from various Government departments:—

Government control of liquor traffic in foreign countries.
Working synopsis of Saskatchewan "Liquor Act."
Maternity benefits.
Immigration laws of countries restricting immigration of Asiatics.
Licensing and regulating of billboards.
Water and Sewerage Boards in the United States.
Doherty Acts.
Preferential voting in Australia.
Optometric Associations.
Eight-hour day.
Employment of women before and after childbirth.
Employment of women and children in industry during the night.
Minimum age for admission of children to industrial employment.
Registration of pure-bred goats.
United States Federal water-powers.
Chiropractors.
Social insurance.
Old-age pensions.
Forest and park reserves in British Columbia.
The six-hour day.
Employment of minors.
Divorce.
Taxation of timber limits in the United States.
Hospitals and State aid.
Farm loans.
Immigration statistics.
Sessional indemnities in Canada.
Unemployment insurance.
Rural nursing.
Taxation of farm lands within cities.

Public debt and finances of various Provinces.
Married women's property legislation.
Testator's family maintenance.
Equal guardianship of infants.
Colonization schemes, public and private.
Co-operative systems.
Titles in Canada.
Income-tax in England and Canada.
Orders in Council *in re* Oriental immigration.
Annuities (Canada).
Wild-lands tax legislation.
Administration of lunatics' estates.
Dominion Seed Regulations.
Foodstuffs (sale), infected wheat.
State Produce Departments (South Australia).
Woodmen's liens (Canada).
Unemployment remedies.
Unearned increment taxation.
Anglo-Japanese Treaty and League of Nations.
River improvement in British Columbia (Dominion Government expenditures, 1914–20).
Land-value taxation.
Hospital maintenance.
Marriage laws (registration of clergymen).
Marriage laws (marriage of deceased brother's widow).
Special legislation for removal and superannuation of inefficient Civil Servants (Canada).
Copyright laws (Great Britain, Canada, and the United States).
Asiatic question in British Columbia.
Forest-protection legislation.
Farm loans.
Agricultural credits.
Land valuation.
Revenue Acts, British Columbia and Vancouver Island.
State budget systems.
Gold-mining Regulations, British Columbia and Vancouver Island.
Mill-dams and reservoirs legislation.
Motor-vehicles legislation.
Building Guilds in Great Britain.
Co-operative tenants.
Qualifications of School Trustees.

For those questions which are deemed of sufficient importance permanent records are preserved for future reference. The collection of data in many instances necessitates large correspondence with Governments of various countries, and where such questions are of legislative interest not only are copies of the laws gathered, but particulars of the results of their operation are obtained.

Two sets of the "Revised Statutes of British Columbia" have been annotated up to the present year, and to further facilitate reference indexes are being made to the annual volumes of Bills as presented to the House. In course of time a complete index covering a series of years will be available, as also a cumulative index to "British Columbia Sessional Papers."

An index to the "Liquor-control Act," comprising over 600 entries, was compiled in the Library and subsequently printed.

In the reading-room 365 newspapers and periodicals are filed regularly. The list has been revised during the past year and some technical journals have been substituted for those of a lighter nature. All back numbers are carefully preserved for future reference. The British Columbia newspapers, *The London Times*, *New York Times*, and other important journals are bound each year. As the cost of binding is very high at the present time, a large amount of binding is being held over until such time as the cost of material, etc., is reduced.

During the session of the Legislature, clippings are made of the proceedings in the House from the leading daily papers of Victoria and Vancouver. These are preserved in clipping-books, which are in a measure a substitute for printed debates.

In the Archives section 1,045 manuscripts were read and classified; of this number, 287 were original autograph letters, and 750 cards were added to the index.

About 5,000 manuscripts were broadly arranged and will be further classified as time permits.

The early manuscript records of the Lands Department are being transferred from their vault to the Archives Department, and an effort is being made to acquire all such documents dated prior to Confederation, which are at present in danger of being lost or destroyed in some of the Government offices. All of this material will be gradually amalgamated with other archives and made more available for officials when research is required. Among the material which has been acquired for the Archives Department, the following documents may be mentioned:—

Copy of correspondence between Hudson's Bay Company and Secretary of State *re* Colonization of Vancouver Island, 1848.

Returns of Addresses of House of Commons, 1848–49.

A number of original letters of Sir James Douglas and Dr. John McLoughlin, and many early documents relating to mining, etc.

Through the courtesy of Sir Leicester Harmsworth the Department is being enriched with the earliest original archives connected with representative government on Vancouver Island, including the appointment under the Great Seal of 1849 of Richard Blanshard first Governor of the Island, also the original lists of British passengers to the Island by the ships "Harpooner," 1849; "Cowlitz," 1850; "Norman Morrison," 1850; and "Tory," 1851.

In addition to the above, we have acquired the valuable collection of Alex. Caulfield Anderson's manuscript letters, journals, and maps. These have already proved very useful in researches made by the Lands and Survey Branch and the local Geographic Board, and as time passes these documents will become more valuable.

The work of classifying and cataloguing books and pamphlets in the local history collection is progressing; there were 2,238 cards added to the history catalogue.

This section of the Library in conjunction with the Archives is used extensively.

The Library and Archives Department has been the recipient of many donations of publications during the past year. Of those to whom thanks are due the following may be mentioned: Sir Herbert G. Fordham, Mrs. Alfred Watt, Rev. R. Connell, Major F. V. Longstaff, A. N. Mouat, Mr. McPherson, and J. Tracey; also to various State Governments, libraries, universities, and other institutions.

In conclusion, it affords me great pleasure to testify to the untiring efforts of the staff to render the best possible service.

All of which is respectfully submitted.

J. FORSYTH,
Provincial Librarian and Archivist.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1922.

ROYAL COMMISSION *re* ALBERT RICHARD BAKER,

Chairman of Game Conservation Board.

(Under "Public Inquiries Act.")

REPORT OF H. C. SHAW, *Commissioner.*

VANCOUVER, B.C., February 16th, 1922.

To the Honourable the Lieutenant-Governor in Council, Victoria, B.C.

SIR,—By Order in Council approved ony the 21st day of November, A.D. 1921, under the provisions of the "Public Inquiries Act," I, Henry Curtis Shaw, was appointed a Commissioner to inquire into the conduct of Albert Richard Baker as Chairman of the Game Conservation Board, and into all allegations of malpractice alleged to have been carried on by the said Albert Richard Baker as Chairman of the Game Conservation Board, and more particularly into the charges preferred by Robert Henry Pooley, member of the Legislative Assembly for Esquimalt, against the said Albert Richard Baker as specifically set out in the said Commission; and as such Commissioner I beg to report as follows:—

Having been duly sworn under the "Public Inquiries Act," I caused due notice to be given in the British Columbia Gazette and in the local papers, and opened the Commission in the City of Victoria on the 25th day of November, 1921, attended by Mr. W. E. G. Johnson, who had been duly appointed stenographer and sworn. Mr. J. N. Ellis, K.C., attended as counsel on behalf of the Government and Mr. D. Donaghy on behalf of Dr. A. R. Baker. Mr. Pooley, who made the charges, although requested by Mr. Ellis to attend and press the charges, did not appear, but sent a letter which Mr. Ellis read, to the effect that he would take no part in the proceedings. I then expressed my desire to receive evidence from any source that would have a bearing on the matters to be investigated or assist me in arriving at a conclusion, and took such evidence as offered or that Mr. Ellis could obtain.

On December 1st, after due notice, I sat as such Commissioner in the City of Vancouver and so on from day to day as witnesses were available; and on December 28th resumed sittings at Victoria, having subpœnaed Mr. Pooley at the request of counsel. Mr. Pooley appeared before me and gave evidence, represented by Mr. H. W. R. Moore as counsel, to whom I gave full privilege of calling witnesses and full liberty to cross-examine all witnesses, and from that time until the closing of the Commission Mr. Moore was present. I also allowed Mr. J. A. Hird, until recently Chief Game Inspector, who seemed very active and zealous against Dr. A. R. Baker, to be represented by counsel, Mr. W. H. Moresby, to examine and cross-examine such witnesses as he desired.

On the 27th day of January, 1922, all witnesses who had presented themselves and who were called upon by the various counsel having been examined, and counsel informing me they had no further evidence to offer, I again called upon any and all who had any material evidence or who knew of any one who had any material evidence to come forward or to give me the names of any such, and no further evidence being forthcoming, at the request of counsel, I allowed several counsel to sum up the evidence, and I then formally closed the Commission.

The inquiry in the terms of the Commission falls into two parts: First, the general inquiry into the conduct of Albert Richard Baker as Chairman of the Game Conservation Board, and the conduct of the Game Department, and into all allegations of malpractices alleged to have been carried on by the said Albert Richard Baker, as Chairman of the Game Conservation Board, in the administration of the "Game Act"; and, secondly, the eighteen specific charges made by Mr. Robert Henry Pooley, as set out in detail in the said Commission.

It will be more satisfactory and convenient to deal with the specific charges first.

Charge No. 1.—Using Government motor-cars and launches for his own personal needs and requirements. The evidence shows that on some occasions Dr. Baker combined departmental business with private pleasure, taking with him his wife and friends at his own expense, except

so far as the use of the boat or car, as the case might be, was concerned, and on some few occasions Dr. Baker frankly admitted he used the boat and car for pleasure-trips, alleging that as he drew no salary for his work on the Game Board he thought there was nothing wrong and that it was a common practice. I make no comment, except to say that technically he had no right to so use the boat and car, but the charge is a very trivial one.

Charge No. 2.—Supplying pheasants in large numbers raised at the expense of the people to his own game preserve. There is no evidence of Dr. Baker having any game preserve, and Mr. Moore admitted this, and I report that there is nothing in this charge.

Charge No. 3.—Wasting public funds. This charge is general and must be dealt with under the general clause.

Charge No. 4.—Wrongfully hiring and dismissing men and illegally paying them cash for services without obtaining vouchers. There was no evidence of any public moneys being paid in cash to any employees. There was no evidence of any wrongful hiring or dismissal. There is evidence of men being employed who complained of not much for them to do, but not knowing all the exigencies of the case it is impossible for me to report on what is a matter of individual judgment and discretion.

Charge No. 5.—Falsifying records of the House of Assembly. I find no evidence to substantiate this charge and Mr. Moore practically admitted that there is none. (*See* page 1874 of the transcript.)

Charge No. 6.—Infringing the "Game Act" by illegally dealing in beaver-skins in close season. This charge was evidently made on the assumption that the Order in Council was not in force. Much evidence was given that the Order in Council was *ultra vires* and that the policy of the Government was detrimental to the beaver industry. In my view I have no jurisdiction in this inquiry to decide on the validity of the Order in Council and no right to comment on the Government policy, but only on Dr. Baker's conduct in carrying out such policy. Such being the case, I must treat the Order in Council as valid, and, if so, there is no evidence to support the charge. Mr. Moore practically admits this. (Page 1874.)

Charge No. 7.—Illegal use of public funds. The only transaction pressed by Mr. Moore in support of this charge is the purchase of 7,500 feet of film, referred to by Mr. Kean (page 1478 *et seq.*) when he received $1,122 by cheque for certain pictures and returned to Dr. Baker $506.50 in cash as the price of raw films used by him in making said pictures. This cash was not put through any books, as Dr. Baker said he did not have any cash account in connection with these films, but simply had to show to the auditor the necessary amount of film; that he bought from Mr. Edwards (dealer in raw film) 7,500 feet of film, worth $506.50, and put it into stock. There is much criticism of this course, the suggestion being that Dr. Baker used this money and when the auditor came, some months later, bought film and made good the shortage. If this were proven it would be a serious breach of duty, but I cannot find that he did so in view of the evidence of Mr. Edwards, a reputable citizen, who swears Dr. Baker bought and paid for 7,500 feet of film within a very few days of the payment to him by Kean. I must accept Edwards's evidence. I must comment on this most unbusinesslike way of paying out Government funds without any record of same, but cannot in this transaction report any malfeasance by Baker, since the money seems to have been actually used to make good the amount of film he was required to have on hand to keep his stock right for the auditor. The transaction was very complicated and certainly justified suspicion. (*See* Kean's evidence, pages 1478 to 1484.) I find no other evidence in connection with this charge.

Charge No. 8.—Inducing his officials to break the laws of this Province. This can only be so on the assumption that the Order in Council is invalid and that Dr. Baker knew it. There is absolutely no evidence to support the charge and Mr. Moore admits this.

Charge No. 9.—Being in collusion with Korsch & Company in the illegal buying and selling of beaver-skins for personal gain. Mr. Moore admitted there is no evidence of this (page 1875), and I find no evidence of any collusion and no suggestion of personal gain on the part of Dr. Baker. Dr. Baker's dealings with Korsch come more properly under the other division of the inquiry and will be dealt with later.

Charge No. 10.—Using the public moneys illegally to further his own personal financial ends. Counsel admits that there is no evidence to support this charge and I find none. (Page 1875.)

Charge No. 11.—Buying and selling beaver-skins for his own personal use and benefit. There is no evidence in support of this charge and counsel so admits. (Page 1875.)

Charge No. 12.—Misfeasance in office in not enforcing the game laws of this Province and deliberately winking at infractions thereof and stifling prosecutions. There is some evidence of prosecutions in several cases being stopped. Bearing in mind that a proper enforcement of the "Game Act" does not necessarily mean punishment of every boy or man who may unwittingly infringe the Act, it is very difficult to report whether, in the cases mentioned, Dr. Baker's judgment may not have been wise. The wisdom of imposing a fine on two boys shooting with a .22 rifle, and who apparently had shot nothing, is questionable. Imposing a fine on a man who had shot a deer under the impression given him by a guide that the season was open; the withdrawal of the charge against one Goldbloom for having beaver castors in his possession when satisfied in his own mind they had been purchased in Alberta; and other similar charges referred to, are all matters, I think, which depend on the judgment of the man in charge of the Department, and I do not think that I, not being in full possession of all the facts should presume to report that he was wrong. In connection with this charge, I find Dr. Baker, at the very time the prosecution of Goldbloom was pending, entered into a bargain with Goldbloom for some marten-skins, and although he may have had a legal right to do so, he can scarcely wonder that those who were watching his every movement would have cause for suspicion, and I report that such bargain, under the circumstances, by the Chairman of the Game Conservation Board was very injudicious.

Charge No. 13.—Using and being party to the wrongful use of Government fur-royalty stamps, whereby furs were stamped without payment of royalty and the Province defrauded of revenue. Mr. Moore practically admits that there is no substantial basis for this charge (page 1875), though he claims that Mr. Campbell, of Harpers Camp, was improperly allowed to stamp furs. Mr. Campbell and his brother, also of Harpers Camp, on account of the insinuation and suggestion made by Mr. Hird, recently Chief Game Inspector, were brought down at great expense and fully explained the use of the stamp. Technically Mr. Campbell had no right to use the stamp, but he satisfied me he did it to help out *bona-fide* trappers, collected the revenue from them, and duly paid it to the Government. The Province lost nothing through Mr. Campbell; and I take this opportunity of stating that Mr. Campbell seemed a man of sterling integrity and honesty and I regret he should have been subjected to some suspicion and put to inconvenience.

Charge No. 14.—Personally profiting by reason of the said wrongful use of said stamps. I find no evidence whatsoever and counsel so admits. (Page 1876.)

Charge No. 15.—Wilfully allowing the killing of beaver and the purchasing and dealing in green beaver-skins contrary to the "Game Act" of this Province. Evidence was given that some green skins were sent down to the Board office and payment was refused. The evidence further shows that as the Order in Council came into force on July 26th, 1921, even an expert could not tell if the skins were secured before or after that date.

Charge No. 16.—Winking at traffic in green skins and purchase thereof by agents with whisky. Mr. Moore says "there is no evidence in support of that charge," and I agree.

Charge No. 17.—Instructing permit-holders to buy skins from persons other than Indians. There is no evidence of Dr. Baker having given any such instructions; in fact, the evidence is all the other way. Some of the buyers, however, assumed no objection would be made if they disobeyed their written instructions.

Charge No. 18.—Ordering motor-cars without authority to purchase. Negotiations took place between one Walters and Dr. Baker *re* the purchase of certain motor-cars. Dr. Baker had no power to buy and says he only agreed to report favourably to the Government. Walters says that Baker ordered them. There was no binding contract entered into, and in the case of oath against oath I cannot make any report or finding on this charge, particularly in view of the fact that the cars were not purchased.

Dealing now with the second phase of the inquiry, I beg to report that all charges of personal wrongdoing by or personal profit to Dr. Baker are not supported by the evidence. Mr. Pooley states that his charges were based on information given him. Mr. Perry specifically states: "All I charge Dr. Baker with is incompetency." (Page 340.) Mr. Hanes deals entirely with his views of the law that the Order in Council was invalid. Mr. Hird, who was recently Chief Game Inspector and who was particularly zealous against Dr. Baker, and who had a great many entries in his note-book, made many charges of wrongdoing, frequently based on hearsay and at other times on suspicion.

I have to thank Mr. Moore and Mr. Donaghy for their meticulous care in sifting all these charges to the bottom, and I find most of them cleared up and none of them proven, so far as personal wrongdoing on Dr. Baker's part is concerned. Much time was spent and much evidence taken that was very immaterial, and I pass this over, confining myself to the points on which stress was laid by Mr. Moore in his review of the evidence, realizing that a careful, able counsel like Mr. Moore would not neglect any material point.

I touch but lightly on the episode of Mr. Hird's book, the loss or taking and finding of the same being a reason urged for doubting the credibility of Dr. Baker. That the book was found by the witness Madill seems clear, and the handing of it in to Dr. Baker's office natural. Although Mr. Hird complained of being handicapped by the loss of the book, he did not use it when it was returned to him, although I gave him opportunity to do so, and I attach little importance to the incident. I have already dealt with the matter of the private use of launches.

With regard to the launch "Rip Rap," much evidence was given. I have to report that this launch was bought by the Purchasing Agent of the Government on reports of proper officials, and whether a good or bad bargain, I do not find any wrongdoing on Dr. Baker's part.

Much time was spent on evidence that Dr. Baker used his position to allow friends to buy beaver-skins privately from Little Bros., the sales agents of the Government, but there was no evidence that Dr. Baker profited in the slightest degree, and the only remark I think I should make is, it was an injudicious thing and did arouse suspicion.

The evidence satisfied me that Dr. Baker allowed two friends from Seattle, who were non-residents of British Columbia, to use his office address and his home address to enable them to buy resident game licences instead of non-resident, but without any advantage to himself.

Dealing with the beaver policy, for reasons already stated, I confine myself to the conduct of Dr. Baker in carrying it out. An emergency had arisen. Indians in unorganized districts had killed and were killing beaver for food and the skins were being illegally sold. Dr. Baker, realizing this, recommended through the Game Conservation Board that the Board be given authority to purchase beaver-skins from the Indians, and the Government gave authority to the Game Conservation Board "to purchase such skins from the said Indians through lawfully authorized agents in that behalf, and for such purpose to receive advances from the Treasury and to make payments therefor, together with such reasonable sums for salaries, expenses, and commissions as may be necessary." The Game Conservation Board entrusted the carrying-out of the order to Dr. Baker as Chairman. Unfortunately there seems to have been a want of harmony between the Game Department and the Police Department, which complicated the situation. The plan suggested of having the Indians bring their skins to the Government Agents and the agents send them to the Game Board, and when sold the proceeds paid to the Indians, less expenses, commends itself, but Dr. Baker decided to license certain fur-traders and send them among the Indians. This plan certainly could not give satisfaction, and later every licensed fur-trader was given a permit to buy. This discrimination was bad. There seems to have been no definite system. The prices to be paid varied in different permits. In the case of Korsch the remuneration to be paid was not even reduced to writing. In the matter of some of the permit-holders the impression existed that no objection would be made if skins were bought from white men as well as from Indians; Korsch's agents were even permitted to ship the skins to Korsch's warehouse in Vancouver and they were then sent over to the Game Board. While there is no evidence of any profit or gain to Dr. Baker, there was absolutely no check on the buyers except their own honesty, which, in the case of some, was very questionable, and there is to-day no means of ascertaining how many of the skins in the possession of the Indians reached the Game Board or how much the trader actually paid to the Indians. The plan, too, is to be condemned, inasmuch as there was a strong tendency to encourage the killing of the beaver. The auditor swore that skins were sent in for all moneys advanced and the account balanced, but this does not show how much was actually paid to the Indians or how many skins were sent out of the Province. On a complete review of all the evidence, I feel I must report that the plan adopted was a bad one as it allowed a dishonest man full opportunity to be dishonest; that there were no means of checking them; that it encouraged the Indians and others for this very reason to kill beaver and sell the pelts; that it made unfair discrimination and perhaps encouraged the Indians to lose respect for the law, all of which it seems might have been avoided by having the Indians deal only with Government officials.

In conclusion, I feel my thanks are due to Mr. Ellis for his assistance to the Commission in procuring witnesses and assisting to make the investigation a searching one, handicapped as he was by not being taken into the confidence of those making the charges and not even knowing the names of their witnesses.

The evidence taken before the Commission, together with exhibits, is enclosed herewith.

All of which is respectfully submitted.

H. C. SHAW,
Commissioner.

VICTORIA, B.C.:
Printed by William H. Cullin, Printer to the King's Most Excellent Majesty.
1922.

PRINTING OFFICE REPORT, 1920-21.

To His Honour WALTER CAMERON NICHOL,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

In accordance with section 14 of the "Statutes and Journals Act," I have the honour to present the following Report.

I have the honour to be,

Sir,

Your obedient servant,

J. D. MACLEAN,

Provincial Secretary.

PRINTING OFFICE REPORT.

RETURN showing the Number of Copies of the Statutes, Journals, and Sessional Papers which have been bound and disposed of during the Twelve Months ending March 31st, 1921, and the Number remaining on hand at that Date, together with a Statement of the Work performed in the Printing Office for the various Departments.

Year.	Statutes.				Journals.				Sessional Papers.				Work performed.				
	On hand April 1st, 1920.	Bound.	Sold.	On hand March 31st, 1921.	On hand April 1st, 1920.	Bound.	Sold.	On hand March 31st, 1921.	On hand April 1st, 1920.	Bound.	Sold.	On hand March 31st, 1921.	No. of Jobs.	No. of Pages. Plain.	No. of Pages. Tabular.	Total No. of Pages	No. of Impressions printed.
R.S. 1911	22	26	33	15	.....	....	....	.....	....	....	....	....					
Vol. 4 1911	18	....	5	13	.....	....	....	.....	....	....	....	....					
1912	255	...	43	212	240	....	....	240	82	....	....	82					
1913	383	....	85	298	180	....	....	180	2	....	....	2					
1914	68	40	71	37	207	....	....	207	9	....	1	8					
1915	50	40	42	48	63	....	....	63	14	....	....	14					
1916	160	60	58	162	156	....	....	156	6	....	2	4					
1917	169	197	69	297	60	....	....	60	15	....	1	14					
1918	29	16	45	....	19	....	3	16	18	....	....	18					
1919	133	....	103	30	110	....	1	109	189	....	112	77					
1920	....	905	866	39	....	200	144	56	....	200	144	56	4,656	17,303	1,417	18,720	8,616,537

STATEMENT of the Number of Statutes sold during the Twelve Months ending March 31st, 1921; also Miscellaneous Receipts, etc.

Particulars.	No. of Copies sold.	Value.
Statutes, 1908	1 vol.	$ 2 50
" Revised, 1911	33 sets.	570 00
" Vol. 4, Revised, 1911	5 vols.	22 50
" 1911	1	2 50
" 1912	43	98 75
" 1913	85	203 25
" 1914	71	168 75
" 1915	42	96 25
" 1916	58	148 25
" 1917	69	162 75
" 1918	45	82 50
" 1919	103	240 50
" 1920	866	1,921 25
	...	$ 3,719 75
Miscellaneous printing, binding, stationery, and advertising in B.C. Gazette	...	234,736 90
Total	...	$238,456 65

SUMMARY OF EXPENDITURE, 1920-21.

(April 1st, 1920, to March 31st, 1921.)

Salaries	$ 113,974 40
Expenses—	
Office supplies	2,407 57
Travelling expenses	10 95
Printing paper and material	77,896 68
New machinery and repairs	7,199 59
Stationery	52,173 54
Total expenditure	$253,662 73

PRINTING AND STATIONERY SUPPLIED TO THE VARIOUS DEPARTMENTS, BRANCHES, AGENCIES, ETC., FOR THE TWELVE MONTHS ENDING MARCH 31ST, 1921.

Service.	Amount.
Department of Agriculture (all Branches)	$ 21,215 26
"Amusements Tax Act"	128 92
Department of Attorney-General (General Office and Miscellaneous)	3,966 66
Agent-General	22 54
Assessor and Collector, Victoria	630 67
Civil Service Commission	910 05
Registrar of Joint-stock Companies	2,731 94
Comptroller-General	1,125 69
Inspector of Dykes	359 23
Department of Education (all Branches)	13,000 38
Employment Bureau, Victoria	75 28
Department of Finance (General Office and Miscellaneous)	7,948 94
Department of Fisheries	815 96
Game Protection Board	2,812 12
Lieutenant-Governor's Office	202 70
Board of Health	4,855 34
Department of Industries	385 15
Bureau of Information	389 45
King's Printer	655 77
Department of Labour (General Office and Miscellaneous)	1,943 72
Department of Lands (all Branches)	37,865 93
Land Registry, Victoria	2,427 70
Land Settlement Board	1,192 26
Inspector of Legal Offices	276 65
Legislation	7,407 33
Provincial Library	1,421 13
Liquor Vendor, Victoria (Prohibition Act)	69 58
Mental Home, Saanich	78 14
Department of Mines (all Branches)	8,924 91
Inspector of Municipalities	472 96
Provincial Museum	410 73
Pacific Great Eastern Railway	154 45
Premier's Office	232 87
Prohibition Commissioner	1,093 86
Provincial Police (all Branches)	6,862 49
Provincial Secretary (General Office and Miscellaneous)	9,319 26
General Election	2,991 11
Temperance Plebiscite	2,092 46
Public Works (General Office and Miscellaneous)	8,702 72
Department of Railways	1,075 68
Returned Soldiers' Commission	647 69
Sheriff, Victoria	89 25
Supreme Court, Victoria	956 07
Surveyor of Taxes	5,858 19
Inspector of Trust Companies	953 94
Provincial Assessor and Collector, Vancouver	1,107 93
Government Agent, Vancouver	726 97
Inspector of Electrical Energy, Vancouver	146 33
Employment Bureau, Vancouver	436 12
Inspector of Factories, Vancouver	180 42
Boys' Industrial School, Vancouver	163 01
Girls' Industrial School, Vancouver	344 32
Land Registry Office, Vancouver	3,172 86
Liquor Vendor, Vancouver	94 05
Liquor Warehouse, Vancouver	268 57
Moving Picture Censor, Vancouver	186 71
British Columbia Patriotic Pictures, Vancouver	152 34
Official Stenographer, Vancouver	383 96
Official Guardian, Vancouver	50 25
Public Works, Vancouver	172 98
Public Utilities Commission, Vancouver	20 79
Superintendent of Neglected Children, Vancouver	954 09
Supreme Court, Vancouver	1,754 17
Sheriff, Vancouver	279 64
British Columbia University, Vancouver	333 75
Workmen's Compensation Board, Vancouver	56 05
Agencies.	
Agassiz	42
Alberni	490 62
Alice Arm	3 16
Anyox	84 27
Ashcroft	290 93
Atlin	216 41
Barkerville	127 17
Beaton	7 51
Chilliwack	46 93
Clinton	390 89
Cranbrook	790 30
Cumberland	825 79
Carried forward	$180,112 89

PRINTING AND STATIONERY SUPPLIED TO THE VARIOUS DEPARTMENTS, BRANCHES, AGENCIES, ETC., FOR THE TWELVE MONTHS ENDING MARCH 31ST, 1921—*Continued.*

Service.	Amount.
Brought forward	$180 112 89
Agencies—Continued.	
Clayoquot	12 63
Duncan	366 08
Esquimalt	224 48
Essondale	1,336 86
Fairview	182 89
Fernie	246 27
Fort Fraser	197 83
Fort George	994 13
Fort St. James	5 00
Fort St. John	7 61
Galiano	35 33
Ganges	8 42
Golden	316 04
Grand Forks	139 57
Greenwood	175 13
Hope	13 78
Hudson Hope	76
Hedley	3 37
Jedway	5 30
Kamloops	963 44
Land Registry (Kamloops)	2,658 11
Kaslo	376 82
Ladysmith	47 41
Lillooet	166 26
Lockeport	7 00
Mayne Island	20 39
Merritt	304 36
Nakusp	13 01
Nanaimo	765 38
Nelson	943 26
Nelson Land Registry	1,432 49
Nelson Supreme Court	98 96
New Westminster	3,541 96
New Westminster Land Registry	1,594 13
New Westminster Supreme Court	376 09
New Denver	38 88
150-Mile House	257 31
Oakalla	442 40
Pouce Coupe	853 67
Pender Island	17 76
Prince Rupert	1,125 88
Prince Rupert Land Registry	362 59
Prince Rupert Supreme Court	152 85
Princeton	757 21
Quatsino	9 25
Quesnel	1,754 52
Queen Charlotte Islands	48 41
Revelstoke	373 28
Rossland	590 72
Sandon	5 00
Slocan	38 95
Smithers	1,144 08
Stewart	91 84
Telegraph Creek	63 46
Telkwa	5 00
Trout Lake	50 53
Vernon	1,014 36
Wilmer	78 09
Yale	60 50
Total	$207,029 98

VICTORIA, B.C.
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1922.

REPORT

Of the Minister of Justice upon the Statutes of the Legislative Assembly of the Province of British Columbia passed during the Session of 1921.

By Command.

J. D. MacLEAN,
Provincial Secretary.

Provincial Secretary's Office,
April 10th, 1922.

AT GOVERNMENT HOUSE,
VICTORIA, B.C., 10th April, 1922.

SIR,—I am directed by His Honour to transmit to you herewith, to be laid before the Government, Minute of Council (P.C. 743), approved by His Excellency the Governor-General on the 31st ultimo, adopting a report of the Minister of Justice recommending the disallowance of an Act of the Legislature of British Columbia intituled "An Act to validate and confirm certain Orders in Council and Provisions relating to the Employment of Persons on Crown Property," also an Order of His Excellency the Governor-General in Council of the same date (P.C. 744) declaring the disallowance of the said Act, to which is attached a Certificate under His Excellency's sign-manual and seal with respect to the date of the receipt of the said Act by him.

I have the honour to be,
Sir,
Your obedient servant,
H. J. S. MUSKETT,
Private Secretary.

The Honourable the Provincial Secretary.

P.C. 743.

Certified Copy of a Report of the Committee of the Privy Council, approved by His Excellency the Governor-General on the 31st March, 1922.

The Committee of the Privy Council have had under consideration the annexed report from the Minister of Justice, dated 27th March, 1922, recommending for the reasons therein stated, that the Statute of the Legislature of British Columbia, chapter 49, assented to on the 2nd day of April, 1921, and received by the Secretary of State of Canada on the 18th day of April, 1921, intituled "An Act to validate and confirm certain Orders in Council and Provisions relating to the Employment of Persons on Crown Property," be disallowed.

The Committee concur in the views of the Minister of Justice as set out in the said report and advise that the said Act be disallowed accordingly.

The Committee, on the recommendation of the Minister of Justice, further advise that a copy hereof and of the accompanying report, if approved, be transmitted to the Lieutenant-Governor of British Columbia for the information of his Government, also that a copy be transmitted to the Japanese Consul-General at Ottawa.

All of which is respectfully submitted for Your Excellency's approval.

G. G. KEZAR,
Assistant Clerk of the Privy Council.

His Honour the Lieutenant-Governor of British Columbia.

DEPARTMENT OF JUSTICE, CANADA.

OTTAWA, 27th March, 1922.

To His Excellency the Governor-General in Council:

The undersigned, referring to chapter 49 of the Statutes of the Legislature of British Columbia, assented to on 2nd April, 1921, received by the Secretary of State for Canada on 18th April, 1921, and entitled "An Act to validate and confirm certain Orders in Council and Provisions relating to the Employment of Persons on Crown Property," has the honour to report that, in view of correspondence exchanged with the Attorney-General of British Columbia, Your Excellency in Council did by Order of 12th November last, pursuant to the authority of section 60 of the "Supreme Court Act," refer to the Supreme Court of Canada for hearing and consideration the following questions:—

(1.) Had the Legislature of British Columbia authority to enact chapter 49 of its Statutes of 1921, entitled "An Act to validate and confirm certain Orders in Council and Provisions relating to the Employment of Persons on Crown Property"?

(2.) If the said Act be in the opinion of the Court *ultra vires* in part, then in what particulars is it *ultra vires?*

And that these questions having been submitted to the Court, counsel were duly heard thereon on behalf of the Attorney-General of Canada, the Attorney-General of British Columbia, the Japanese Association of British Columbia, and the Shingle Agency of British Columbia, and the matter coming on for judgment on 7th February last, "the answer of the Court to the first question submitted by His Excellency the Governor-General is in the negative. It is therefore unnecessary to answer the second question. Idington, J., dissenting; Brodeur, J., dissenting in part."

It thus appearing that the Legislature had no authority to enact the Statute in question, the undersigned recommends that the said Statute be disallowed, and that a copy of this report, if approved, be transmitted to His Honour the Lieutenant-Governor of British Columbia and to the Japanese Consul-General at Ottawa.

Humbly submitted.

(Sgd.) LOMER GOUIN,
Minister of Justice.

P.C. 744.

AT THE GOVERNMENT HOUSE AT OTTAWA.

FRIDAY, the 31st day of March, 1922.

PRESENT:

HIS EXCELLENCY THE GOVERNOR-GENERAL IN COUNCIL.

Whereas the Lieutenant-Governor of the Province of British Columbia, with the Legislative Assembly of that Province, did on the 2nd day of April, 1921, pass an Act, chaptered 49, and intituled "An Act to validate and confirm certain Orders in Council and Provisions relating to the Employment of Persons on Crown Property":

And whereas the said Act has been laid before His Excellency the Governor-General in Council, together with a report from the Minister of Justice, recommending that the said Act should be disallowed:

His Excellency the Governor-General in Council has thereupon this day been pleased to declare his disallowance of the said Act, and the same is hereby disallowed accordingly.

Whereof the Lieutenant-Governor of the Province of British Columbia and all other persons whom it may concern are to take notice and govern themselves accordingly.

G. G. KEZAR,
Assistant Clerk of the Privy Council.

His Honour the Lieutenant-Governor of British Columbia.

I, Julian Hedworth George, Baron Byng of Vimy, Governor-General of Canada, do hereby certify that the Act passed by the Legislature of the Province of British Columbia on the 2nd day of April, 1921, chaptered 49, and intituled "An Act to validate and confirm certain Orders in Council and Provisions relating to the Employment of Persons on Crown Property," was received by me on the 18th day of April, 1921.

Given under my hand and seal this 31st day of March, 1922.

[L.S.] BYNG OF VIMY.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1922.

PROVINCE OF BRITISH COLUMBIA

REPORT

OF THE

COMMISSIONER OF FISHERIES

FOR THE YEAR ENDING DECEMBER 31ST, 1921

WITH APPENDICES

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1922.

To His Honour WALTER CAMERON NICHOL,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

I beg to submit herewith the Report of the Provincial Fisheries Department for the year ending December 31st, 1921, with Appendices.

WILLIAM SLOAN,

Commissioner of Fisheries.

Provincial Fisheries Department,

Commissioner of Fisheries' Office,

Victoria, British Columbia, January, 1922.

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FISHERIES COMMISSIONER'S REPORT FOR 1921.

Value of Canadian Fisheries and the Standing of Provinces.

The value of the fishery products for Canada for the year 1920 totalled $49,241,339, compared with $56,508,479 in 1919 and $60,250,544 in 1918.

During the year 1920 British Columbia produced fishery products of a total value of $22,329,161, or 39.4 per cent. of the total fishery products for the Dominion.

British Columbia again led all the Provinces of the Dominion of Canada in the value of her fishery products. Her output for 1920 exceeded that of Nova Scotia by $9,586,502, and it exceeded that of all the other Provinces combined by $8,160,742.

The following statement gives in the order of their rank the value of the fishery products of the Provinces of the Dominion for the years 1918, 1919, and 1920:—

Value of Fisheries by Provinces, 1818, 1919, and 1920.

Province.	1918.	1919.	1920.
British Columbia	$27,282,223 00	$25,301,607 00	$22,329,161 00
Nova Scotia	15,143,066 00	15,171,929 00	12,742,659 00
New Brunswick	6,298,990 00	4,979,074 00	4,423,745 00
Quebec	4,568,773 00	4,258,731 00	2,592,382 00
Ontario	3,175,111 00	3,410,750 00	3,306,412 00
Prince Edward Island	1,148,201 00	1,536,844 00	.....
Manitoba	1,830,435 00	1,008,717 00	.....
Saskatchewan	447,012 00	475,797 00	2,108,257 00
Alberta	318,913 00	333,330 00	.....
Yukon	37,820 00	8,800 00	.....

The Species and Value of Fish caught in British Columbia.

The total value of each species of fish taken in British Columbia for the year ending December 31st, 1920, is given in the following statement:—

Salmon	$15,129,348
Halibut	4,104,869
Herring	1,228,131
Whales	435,746
Pilchards	540,265
Cod	322,737
Black cod	181,202
Flounders, brill, etc.	55,348
Soles	20,012
Crabs	57,963
Clams and quahaugs	33,363
Red cod	20,016
Oysters	36,834
Perch	16,437
Grayfish	4,550
Shrimps	13,536
Smelts	15,936
Octopus	4,082
Sturgeon	3,775
Skate	2,697
Oolachans	9,096
Fur-seals	24,712
Shad	205
Tomcod	60
Hake and cusk	1,255
Bass	798
Whiting	274
Eels	162
Fish-oil	31,155
Fish-offal	1,462
Fish-fertilizer	37,685
Total	$22,329,161

The catch of salmon in 1920 was valued at $2,407,818 less than in 1919 and $2,077,897 less than in 1918. The price received for the pack of 1920 was relatively considerably higher than in 1918 and 1919, but the pack was much less than that made in those years.

THE SALMON-PACK OF 1921.

The salmon pack in the Province in the year 1921 totalled 603,548 cases, compared with 1,187,616 cases in 1920, 1,393,156 cases in 1919, and 1,626,738 cases in 1917. The total pack for 1921 was less than 50 per cent. of the average pack of the Province for the preceding ten years. There was a marked decline in the catch of all species. The catch of sockeye, spring, and cohoe was due to a poor run to all waters. The pack of pinks and chums was small owing to the lack of demand for those grades. Very few canners packed any chums.

The total pack of sockeye for the year was 163,914 cases, as against 136,661 cases in 1920, 167,944 in 1919, 210,851 in 1918, and 402,538 cases in 1917. The catch in every district shows a decline.

THE 1921 SALMON-PACK BY DISTRICTS.

The Fraser River.—The total pack of all species of salmon in the Fraser River District in the Province in 1921 totalled 107,650 cases, as against 136,661 in 1920, 163,123 cases in 1919, 276,459 cases in 1918, and 330,209 cases in 1917.

The catch of sockeye in the Provincial waters of the Fraser River system produced a pack of 39,631 cases, as against the preceding fourth year of 148,164 cases, and compared with the pack of eight years ago of 719,796 cases.

The 1921 pack of sockeye in the State of Washington waters of the Fraser River system in 1921 totalled 102,967 cases, as against 411,538 cases in 1917 and 1,665,728 cases in 1913.

The total pack of sockeye in the entire Fraser River system in 1921 was 142,598 cases, compared to 559,702 cases in the preceding fourth year and to 2,385,524 cases in the preceding eighth year. The pack of sockeye in the system in 1921 was less than 6 per cent. of that of the big year 1913. The full effect of the blockade in the Fraser River Canyon at Hell's Gate in 1913 and the heavy drain made on the remnant of that run in 1917 is now fully manifest. The run of former big years has dwindled to less than the average of recent lean years. The Fraser is fished out of sockeye. The big run has been destroyed.

The Salmon-catch of Northern Waters.

The Skeena River.—The salmon-catch in the Skeena River in 1921 totalled 234,765 cases, as against 332,887 cases in 1920, 398,877 cases in 1919, and 374,306 cases in 1918. There was a marked decline in the catch of all species of salmon. The catch of sockeye was the smallest ever made on the Skeena and totalled but 41,118 cases. The catch of spring produced a pack of 21,765 cases; cohoes, 45,033; pinks, 124,457; and chums, 1,993 cases.

Rivers Inlet.—The salmon-pack of Rivers Inlet was again very disappointing. It totalled for all grades but 59,272 cases. The sockeye-catch was also the smallest ever made at Rivers Inlet and produced a pack of but 43,300 cases; cohoes, 4,718; and pinks, 5,305 cases.

The Nass River.—The salmon-pack of the Nass River totalled but 51,765 cases, consisting of 9,364 cases of sockeye, 8,236 cases of cohoes, 29,488 cases of pinks, and 2,176 cases of chums.

SALMON CONDITIONS IN NORTHERN WATERS.

It becomes more and more apparent, from a study of the records of the catch of sockeye and the reports from the spawning areas, that the runs of salmon to our northern waters are being rapidly depleted, and that unless greater protection is given them than has been afforded in the last few years they will go the way of the runs to the Fraser. They cannot stand the drain that has been and is now being made upon them. When it is shown that in District No. 2, our northern waters, (1) there has been since 1912 a material decrease in the catch, notwithstanding there has been an increase in the amount of gear used; (2) a great increase in the area of waters where fishing is conducted; and (3) a very great increase in the price paid for fish, it is evident that less fish are seeking entrance to the spawning area and that the escapement is less.

It has been previously pointed out that by resorting to averages of the pack which cover periods of years, the supply, with a considerable degree of certainty, can be determined. The following statements should be of value in this connection:—

Statement showing Average Sockeye-pack, Number of Boats licensed, and Prices paid for Sockeye on Skeena, 1903 to 1918, inclusive.

Period.	Average Sockeye-pack.	Average Number of Boats licensed.	Average Price paid Fishermen for Sockeye.
			Cents.
1903–06	78,868	600	10
1907–10	130,851	800	10
1911–14	103,164	908	12½
1915–18	91,427	876*	24†

* In 1919, 1,150 boats were fished, and in 1920, 1,109.
† In 1920 and 1921 fishermen were paid 30 cents each for sockeye.

Statement showing Average Sockeye-pack, Number of Boats licensed, and Price paid Fishermen for Sockeye on Rivers Inlet, 1903 to 1918, inclusive.

Period.	Average Sockeye-pack.	Average Number of Boats licensed.	Average Price paid Fishermen for Sockeye.
			Cents.
1903–06	91,846	550	10
1907–10	92,118	700	10
1911–14	88,320	750	12½
1915–18	65,720	815*	24†

* In 1920, 871 boats were fished, and in 1921, 1,000.
† In 1920 fishermen were paid 30 cents for sockeye and 55 cents for all over 600. In 1921 fishermen were paid 30 cents for sockeye.

The record of the sockeye-pack on the Skeena for the ten years 1902 to 1911 shows that it was 24 per cent. greater than it was in the following ten years, notwithstanding that in the latter period the amount of gear and the price paid for the fish and the area of the waters in which fishing was conducted were all far greater than in the first period. The average pack from 1902 to 1911, inclusive, was 108,762 cases, as against 95,682 cases from 1912 to 1920, inclusive, or 13½ per cent. greater. Up to 1912 the number of boats and nets engaged in the Skeena fishing did not average over 700 per year, as against an average of 900 from 1912 to 1920, an increase of over 28 per cent. In 1920 and 1921 there was an average of 1,129 boats and nets fished, an increase over the period of 1902 to 1911 of 60 per cent.

Up to and including 1908 no fish were taken in the Skeena District outside of Kennedy Island, at its mouth. In recent years the waters from 15 to 20 miles outside that island have been successfully fished by many boats.

The sockeye-catch at Rivers Inlet for the ten years 1902 to 1911 produced a 26-per-cent. greater pack than was made in the following ten years, notwithstanding that in the later period there was in increase of 27 per cent. in the number of nets employed. Up to 1912 the price paid for sockeye did not exceed 10 cents. From 1912 to 1915 the price was increased to 12½ cents, for 1916 to 1919 it was increased to an average of 24 cents, and in 1920 the fishermen were paid 30 cents each for all the sockeye caught up to 600 and 50 cents for all over that number.

In considering these statements it should not be overlooked that during the war period 1915–18 every effort was made to increase food production. Had the numbers of sockeye in the waters leading to the spawning area of District No. 2 during the war period, or since, been as numerous as they were in earlier years, the catch would most certainly have been increased and not diminished. It should be noted that in consequence of the increased price paid for sockeye the Indians engaged in fishing in recent years have been far more industrious than in the years when but 10 and 12 cents was paid them for fish, and that in consequence their average annual catch has compared much more favourably with that made by the whites and Japanese fishermen.

No other conclusion can be drawn from a study of the records in our northern waters than that there has been a serious reduction in the number of fish that now seek the spawning area, and that unless the fish are given much greater protection than is now afforded them by the fishery regulations the run will be destroyed.

In considering conditions at Rivers Inlet and on the Skeena, it is to be noted that no inspection was made by this Department of conditions on the spawning-bed of the Skeena in 1916, 1917, and 1918. The investigations of the spawning-beds of Rivers Inlet in 1916 and 1917 disclosed unsatisfactory conditions. Fishery Overseer A. W. Stone, who has made an annual inspection of that section since 1912, in his report for 1916, wrote: "I am of the opinion, after closely investigating conditions on the spawning-beds of Rivers Inlet, that the number of sockeye that reached the beds this year falls below that of the seasons of 1913, 1914, and 1915 by close to 75 per cent., and is due to a poor run to the inlet this year." Of conditions in 1917 he wrote: "I am of the opinion that there was a general falling-off in the number of sockeye that reached the beds this year; although better than last year, the run in no way approaches the vast numbers seen on the beds in 1914 and 1915."

The seriousness of the situation in our northern waters is further made manifest by the evidence submitted in Dr. Gilbert's analysis of the sockeye runs to Rivers Inlet, the Skeena and Nass Rivers in 1920 and 1921, which will be found in the Appendix of this report and which is reviewed in the following pages.

CONTRIBUTIONS TO THE LIFE-HISTORY OF THE SOCKEYE SALMON.

Dr. C. H. Gilbert's seventh contribution to the reports of the Department on the life-history of the sockeye salmon, which is issued herewith, contains an analysis of the sockeye runs to the principal waters of the Province for the years 1920 and 1921.

It will be recalled that for physical reasons Dr. Gilbert was unable to furnish a report of the 1920 run in time to include it in the Department's report for that year.

With the present paper we now have a complete analysis of the runs of sockeye to all our principal rivers for the past nine years. They are of great economic and scientific value, as they disclose the facts in the life-history of the sockeye that are essential to an intelligent conduct of our most valuable fishery. The facts submitted demonstrated beyond all question that the runs of sockeye to all our waters have been seriously depleted, and that they will be destroyed unless they are given far greater protection than has heretofore been afforded.

The following is a brief summary of Dr. Gilbert's present contribution:—

Rivers Inlet Sockeye Runs of 1920 and 1921.

In his previous report—1919—Dr. Gilbert commented on the prospects for 1920, calling attention to the fact that the brood-years which would be responsible for the run of 1920 exhibited a wide disparity. The five-year fish in 1920 would be derived from eggs laid down in 1915, when the pack of Rivers Inlet sockeye exceeded 130,000 cases and was the largest ever put up in this district. The four-year fish, on the contrary, would be descendants of 1916, with a pack of less than 45,000 cases, the smallest of any recent year. He then wrote: "The results during 1920 will possess more than usual interest, for in the two brood-years of that season we find contrasted, as above indicated, the poorest and the very richest years of which we have a record. It will be most interesting to observe whether the five-year age-groups will appear in 1920 in overwhelming proportions." His study of the 1920 run disclosed such to be the case. The run was gratifyingly large after a series of four very poor years. It was practically all derived from 1915; the proportion of four-year fish was but 5 per cent. of the total run. Some 115,000 of the 121,000 cases of the 1920 run were the results of the 1915 brood, and approximately 26,000 cases of the 1919 pack were from the same brood. "If we assume," he states, "that the packs of these two years give reliable indications of the size of the runs, then the four-year fish that developed from the 1915 brood represented 18 per cent. and the five-year fish 82 per cent. of the total progeny of that brood. It is facts of this nature that lead us to call the Rivers Inlet cycle predominantly one of five years, in contrast to the Fraser River cycle, well-known to be one of four years."

The five-year males of the 1920 Rivers Inlet run averaged 26 inches and the females 25 inches in length, and were practically identical in size with the same year-groups in 1915 (26 and 25.1 inches), which was the brood-year for these fish.

Dr. Gilbert has previously called attention to the fact that with diminishing runs in Rivers Inlet the size of the fish was also decreasing; no cause, he states, is known for such a coincidence, but it is interesting to observe that the size of the individuals promptly recovered in a good-year run.

Rivers Inlet Sockeye Run for 1921.

After presenting nearly a maximum pack in 1920 (124,254 cases), the Rivers Inlet sockeye run declined in 1921 to the lowest level, with one exception, since the industry has been well established. The exception occurred in 1916, and it is worthy of consideration that a five-year period is thus seen to have intervened between the two lowest packs the river has produced, and, as has been stated, a five-year period also separates the generous run of 1920 from the record pack of the river which occurred in 1915, and was in excess of the 130,000 cases, and another period of five years between 1915 and 1910 with its 126,000 cases. The three largest packs at Rivers Inlet are thus shown to be separated by five-year intervals, as though one were the direct descendant of the other.

The Rivers Inlet sockeye run in 1921, as in previous years, consisted of two age-groups, those that matured in their fourth year and those that matured in their fifth year. In both of these groups the early history is the same. They spent the first year in fresh water and descended to the sea early in their second spring. In upwards of 1,000 individuals examined by Dr. Gilbert only one was found which had spent two growing seasons in the lake, and it matured in its fifth year. Though this type is abundant in many river-basins, its almost total absence in the Owikeno basin may conceivably be due to the same adverse feeding conditions which apparently dwarf the fingerling migrants during their first year.

As has been noted in previous reports, the most prosperous seasons at Rivers Inlet are distinguished by large percentages of the five-year group, and this was the case in 1921. Fifty-one per cent. of the run consisted of five-year fish and 49 per cent. of four-year fish, the total pack being but 46,300 cases; while in 1920, with a pack of 121,254 cases, 95 per cent. were five-year fish and but 5 per cent. four-year fish. The average lengths and weights of the 1921 run depart but little from the averages of the eight preceding years. The four-year fish were fully up to the average, but the five-year females were notably lacking in both length and weight, and the five-year males only less so.

The Sockeye Run to the Skeena in 1920 and 1921.

Dr. Gilbert shows that the Skeena River sockeye run of 1920 agreed with that of Rivers Inlet in being derived in part from a good brood-year and in part from a very poor brood-year. The five-year fish of 1920 belonged to the brood of 1915, which produced a pack of 116,553 cases; while the four-year component of the 1920 run was derived from the brood-year of only a 60,923-case run. The result was clearly reflected in the character of the run, which was well below the average in size, giving a pack of only 90,869 cases. The run consisted largely of five-year fish, showing that the run of 1916 contributed very little to its number. Like the Rivers Inlet and the Nass River colonies of sockeye, the Skeena is dependent more on its five- than its four-year members, and thus approximates a five-year cycle. The average percentage of the five-year group in the eight years from 1912 to 1919 is 60 per cent. and the highest attained in any year was 75 per cent. But in 1920 the five-year group comprised 82 per cent. of the one-year-in-lake type, and must be attributed to their favourable brood-year, in conjunction with the very favourable brood-year for the four-year fish. As already noted, an entirely similar condition in Rivers Inlet produced in 1920 a still larger representation of the five-year group, 95 per cent. of the run.

The salient features of the sockeye run in the Skeena in 1921, Dr. Gilbert states, are best brought out by a comparison with the run of 1920. The latter was produced by the good brood-year 1915 and the poor one of 1916. The result was a run of medium size, over four-fifths of which were progeny of 1915. The run of 1921 had as antecedent two extremely poor brood-years, the worst, with a single exception, that has hitherto occurred on the Skeena. The result of this portentous combination was, in 1921, a still lower level of production than the Skeena has previously attained. The pack of only 41,000 in 1921 registered a further decline of 35 per cent., compared with the extremely meagre yields of the two brood-years that produced it.

Discussing this feature, Dr. Gilbert states: "If the salmon runs were enemy forces that we were desirous of annihilating, no more certain method could be devised than destroying them

thus in detail. The detachments appearing each year operate wholly independently of those that immediately precede and follow. If we succeed in destroying only one or two annual detachments in a five-year cycle, the results become cumulative and the eventual destruction of the run is assured.

"It cannot too often be urged that a rational policy of conservation must prescribe a large annual safety factor. We must continue each year to provide for the escape of larger numbers of spawning fish than are necessary to ensure adequate production during seasons in which conditions are favourable. A rationally controlled stream will show its spawning-grounds each year seemingly overpopulated. This is nature's method of preventing serious depletion during the not infrequent years when conditions are unfavourable for successful propagation and growth, and there is no other safe method. Failure to observe this obvious precaution must be held responsible in no small measure for the certain depletion with which all our salmon-streams are threatened.

"The appearance of occasional good years in the course of a declining run is customary and to be expected. They should not serve in any degree to allay our apprehensions. Poor years also, it is true, have occurred during the most prosperous periods of productivity in our streams. But in a declining salmon run the poor years become more numerous, they infallibly in the long run produce their kind, and they fall to lower and lower levels. The average production for a series of years can always be depended on to tell the tale.

"With these facts in mind, no one can doubt the serious condition we are fast realizing on the Skeena and, it may be just to remark, on all the great salmon-rivers of the Province.

"The measures adopted in 1908 for the preservation of salmon-fisheries for the Province were of much promise. By preventing the incursion of new canneries in districts already fully developed, and by limiting the amount and character of the gear that should be used in each fishing district, a measure of control was assumed which would, if adequately administered, ensure the preservation of the salmon run. This method is incontestably the best that has been devised for the purpose. Opposed to it stands the alternative method of unrestricted competition, the results of which are now so alarmingly manifest in the waters of Alaska. But restrictions in numbers of canneries and in amount of fishing-gear obviously will not suffice to protect a stream unless the restrictions are adequate in amount.

"It is impossible to know in advance the utmost extent of the drafts that can safely be made on the run of any stream. Cannery restrictions and adequate boat-rating must always be considered tentative measures. The situation is one that calls for solicitous inspection and constant watchfulness. Regulations should be subject to annual revision on the part of responsible officials closely in touch with conditions as they develop."

The Fraser River Sockeye of 1920.

The total pack of the Fraser River sockeye in 1920 amounted to 111,053 cases, and showed little change from the packs of 1916 (116,783) and 1919 (103,200). The season of 1918 (71,572) still shows the river at its lowest ebb, while 1917 (559,702) exhibited the last remains of the former big years of the Fraser River cycle. The average pack for the three years 1916, 1919, and 1920 is 110,345 cases, so the condition of the runs seems neither to have improved nor deteriorated within that period, unless, perhaps, an improvement is shown in 1920 by the better conditions on the spawning-grounds shown in the Department's report for that year.

The small number of three-year grilse occurring in the run of 1920, and the bearing of this fact on the probable size of the run of 1921, has already been discussed by Dr. Gilbert in the Commissioner's report for 1920. The three-year males, to which the term "grilse" is applied, always belong to the prevailing Fraser River group, characterized by having spent one whole year in fresh water before migrating to the sea. The other members of the Fraser group mature either in their fourth or in their fifth years, the four-year contingent predominating always in the Fraser basin.

The four-year fish in the 1920 run, Dr. Gilbert shows, consisted of 77 per cent. and the five-year fish 23 per cent. of the one-year-in-the-lake group. These percentages have remained practically the same since the Fraser run definitely declined to its present low rate of production, in 1916. Prior to that date the proportions of four- and five-year sockeye in successive runs fluctuated widely. To illustrate this, Dr. Gilbert gives a list of all except the big years since 1912, from which it appears that the four-year percentage varied only between 76 to 77 in 1916,

1918, 1919, and 1920. While these figures represent averages for the entire season, in each year there was a wide range during the course of the run. In 1920 the four-year fish ranged from 57 per cent. at the beginning of the run to 97 per cent. in the middle of July, and during the height of the run, the last week in July and the first half of August, the percentage characteristic of the entire season was attained. Dr. Gilbert states that "these varying percentages are characteristic of special stream-colonies found in the river during definite portions of the run, or of groups of colonies that enter the river together."

The relative number of males and females in the different year-groups is a comparatively constant feature in each river-basin, but varies appreciatively in different races of sockeye. It rises to the dignity of a racial character. In the record of the Fraser for a series of years the males and females of the four-year fish, and also the five-year fish, are approximately equal in number. This condition contrasts strikingly with that found in Rivers Inlet, where each year shows that four-year males are much in excess of four-year females, while the five-year females are more numerous than the five-year males.

The lengths of both four- and five-year fish in the Fraser in 1920 were below the average for that river-basin. Dr. Gilbert called attention to this same condition in the run of 1919. The average lengths of four-year males during five years prior to 1919 was 25 inches, and of the four-year females during the same period 24.1 inches. In 1919 the males averaged 24.1 inches and the females 22.8 inches; and in 1920, 24.1 and 23.2 inches. In dealing with this feature, Dr. Gilbert states: "In the recent reduction of the Fraser River sockeye run the smaller sizes characteristic of one or more tributaries may have suffered less extensively than the larger sizes, which could not pass through the meshes of the gill-nets. The smaller races may be in larger proportions than formerly, and thus pull down the average for the run."

Of the two-year-in-the-lake type of the Fraser run, it is shown that evidence accumulates that the colonies bound for different tributaries enter the Fraser in regular order and on comparatively constant dates. Year by year, relatively to the other colonies, they seem to maintain their proper place in the procession. In both 1916 and 1920 the two-year-in-the-lake type was running in moderate fashion during the latter part of June and almost wholly disappeared in July, to again appear in August.

As throwing additional light on the definite schedule of events which characterizes the Fraser River run of sockeye, Dr. Gilbert again notes that the run of individuals which have proceeded to sea shortly after hatching, and as soon as they become free swimming, did not begin in 1920 until after the middle of July. So close a chronology as July 14th, 15th, 17th, and 19th for the first appearance of the fish of this type in the runs of four different years is striking evidence of the regularity with which the run is conducted year by year. Individuals of sea-type and those of the two-year-in-lake type are the only ones that can with certainty be recognized always in a composite assemblage, such as that which comprises the Fraser River run.

The Fraser River Sockeye Run of 1921.

In analysing the Fraser River sockeye run of 1921, Dr. Gilbert states: "As a lineal descendant of the series of quadrennial big years of the Fraser, 1921 possesses a special interest. Some traces of its origin are discernible. In size the run ranks somewhat above the very low estimate of the present small years, among which we must go back to 1915 to find as large a pack. It diverges from the recent small years which precede it in the limited number of the five-year group which were present. It will be recalled that in 1913, before the big years had suffered any reduction in numbers, it was essentially of four-year fish. Diligent search was necessary at that time for the detection of any five-year individuals. The run was then derived from eggs laid down the previous big year, four years before, and contained no contribution of consequence from any other year. Five-year individuals of course were present in numbers which would have made them conspicuous in a small year, but they were "concealed by the vast hordes of four-year-olds, the progeny of the last big run."

"This condition characterized all the big years until 1917, when the run was cut to a fourth or a fifth of its previous dimensions. This reduction has not affected the five-year contingent of that run, for the five-year fish of 1917 had been spawned in 1912, before the catastrophe that closed Hell's Gate Canyon to the ascent of the 1913 run. They were present in their usual numbers and were associated with so reduced a body of four-year fish that their presence was easily discovered. In the earlier and in the latter part of the run, in fact, the five-year fish in

1917 attained considerable proportions in the run; in June 16th, 66 per cent; June 25th, 37 per cent.; June 28th, 20 per cent; and July 4th to 14th, 4 or 5 per cent." It is shown that the total numbers of four-year fish contained in the twenty-one samplings examined amounted to 94 per cent. and the five-year fish to 6 per cent. of both groups.

With 1917 Dr. Gilbert now compares the run of 1921, which also began the season with a high percentage of five-year fish, which then decreased rapidly in the early part of July and increased again toward the last of the run. The total number of individuals examined in both age-groups was 997, with 84 per cent. four-year fish and 16 per cent. in the five-year class.

It will be recalled that prior to 1921 a series of small years had exhibited a remarkable uniformity in the relative sizes of the age-groups. In 1916, 1918, 1919, and 1920 the percentage of four-year fish was either 76 or 77. In 1917, with a recognizable remnant of the big-year series still persisting, the percentage of four-year fish rose to 94 per cent. in approximation of 1913, when it was 99 per cent.; and in 1921, when a faint vestige of the big-year cycle still can be traced, the percentage drops to 84, but is still well above the small years with which it is associated.

The length of the four-year fish in the 1921 run exhibits a further decline. The tendency has been marked since 1919. Dr. Gilbert also states that a similar reduction in size is to be noted in recent years at Rivers Inlet. The further history of this tendency will be a matter of interest.

The Nass River Runs in 1920 and 1921.

Dr. Gilbert's digest of the sockeye runs to the Nass in 1920 and 1921 is as thorough and complete as that of our other salmon-rivers. In 1919 he called attention to certain disquieting features in the recent history of that river, and stated that extreme interest would attach to the history of the next few years, because the runs would demonstrate to what extent the Nass has been depleted. The runs of 1920 and 1921 go a long way to justify the foreboding entertained. The pack of 1920 was but 16,740 cases, nearly 25 per cent. less than the smallest pack of recent years. The sockeye-pack of the Nass in 1921 totalled but 9,364 cases, or 6,376 cases less than that of the preceding year, when the pack was the smallest made on that river.

The Nass has a five-year cycle. The average pack for the last cycle, 1916 to 1920, is 24,083 cases, and for the preceding cycle, 1911 to 1915, is 33,523 cases. Three years of the previous cycle had each a larger pack than was made in any single year of the last period, and three years of the last period had each a lower record than was made in any year during the preceding five-year cycle. Such evidence conclusively demonstrates that the runs of sockeye to the Nass have suffered such serious impairment that "all of those interested in the perpetuation of the industry should co-operate to lessen the intensity of fishing operations in the district before depletion has become a fact. The condition has become highly critical."

The above summary of Dr. Gilbert's report for the years 1920 and 1921 inadequately displays the nature and the value of his work. Those interested will find the complete report attached hereto.

THE ALASKA FUR-SEAL HERD AND THE SOCKEYE OF THE FRASER RIVER SYSTEM.

In 1911 a convention was signed by Great Britain, the United States, Japan, and Russia, prohibiting their people from pelagic killing of fur-seals. Under its terms the United States was permitted to kill a number of the batchelor males on the Pribyhoff Islands in Alaska and to pay to each Government a percentage of the sale of the skins taken.

Following the treaty, the United States imposed a closed season on the islands for five years, during which no seals were killed. It resulted in a satisfactory increase. Since then the killing of batchelor males only has been resumed under direction of United States officials. The killing of surplus males is of direct benefit to the herd, as on their reaching maturity the males fight so fiercely for possession of the rookeries that they kill many of the young pups. The skins of the males taken on the islands—none are killed in the sea—and sold since 1917 realized over $7,000,000, of which sum Great Britain has received 15 per cent.

In 1873 the number in the herds of fur-seals on the Pribilof Islands was estimated at 2,500,000 individuals. In 1911, when the convention was signed, the herds had been reduced to 125,000. The census recently taken shows that the herd now contains over 500,000 individuals, and it is confidently expected that under the protection now afforded the herds will attain their original numbers. It is estimated by experts that within a few years the skins of 100,000 surplus

males will be taken annually, and that Great Britain's share, that is paid to Canada, will amount to $1,000,000 per year. An authority writing on the subject states: "The value of conservation has never been more swiftly or more decisively illustrated."

A convention by Great Britain and the United States that would afford to the schools of sockeye salmon that yet remain in the Fraser River system and in the open sea the same measure of protection now afforded the fur-seal would in twenty or thirty years give a far greater return than has come or will come from the convention of 1911. The sockeye salmon of the Fraser River system can and should be handled in the same businesslike manner as Great Britain, the United States, Japan, and Russia have successfully handled the fur-seal question. It is the only way in which this vital situation can be handled. It is an international question and it can be handled only in an international way.

REPORTS FROM THE SALMON-SPAWNING AREAS OF THE PROVINCE IN 1921.

Following the practice inaugurated in 1902, the Department conducted investigations of the spawning areas of the Fraser, Skeena, and Nass Rivers and Smith and Rivers Inlets. The detailed reports from each section for 1921 will be found in the Appendix of this report.

The Fraser River.—John P. Babcock, Assistant to the Commissioner, again inspected the spawning area of the Fraser River basin. It was his eighteenth annual inspection. Major J. A. Motherwell, Chief Inspector of Fisheries for the Dominion in the Province, accompanied him over the greater portion of the area, and he is indebted to him and his assistants, and also many local residents, both white and Indians, scattered over the basin, for information of value as to conditions.

Mr. Babcock in his report states that sockeye made their appearance at Hell's Gate in the Fraser Canyon, above Yale, late in July, and were observed there during August and September. The run was greatest in August. "At no time this year were sockeye observed there in as large numbers as in 1920." No pink salmon were seen there during the year or in the waters above, and none have been since the disaster in 1913. On the other hand, the number of spring salmon seen at Hell's Gate was larger than usual.

Attention is called to a press statement that the sockeye that pass through the Fraser Canyon to the waters above enter the Fraser annually in July, and that the August run to the Fraser spawns annually in the tributaries of that stream below Hell's Gate. Such, Mr. Babcock states, is not the case. Every season since observations were begun in 1901 more sockeye have been seen at Hell's Gate in August and September, and in some years in October, than at any time in the month of July. In 1901 and again in 1905 there was a good run of sockeye through the canyon in November, and they have been seen there in considerable numbers in December.

The report deals with conditions in all sections and shows that very few sockeye reached any one of them this year. In concluding the report, Mr. Babcock states: "A summary of conditions of the spawning area of the Fraser basin this year shows that, notwithstanding the fact that 1921 was in the cycle of former big runs, the run of sockeye was no larger and the spawning-beds no better seeded than in recent lean years. The quadrennial big run of sockeye to the Fraser has been destroyed. There were not eggs enough deposited on the Fraser this year to produce an ordinary lean-year run."

Rivers Inlet.—The spawning-beds of Rivers Inlet were again inspected by Fishery Officer A. W. Stone in 1921. It was his ninth fall trip over the tributaries of Owikeno Lake, the spawning area of the Rivers Inlet run. His report gives in detail his observation on each of the tributaries. In summarizing the general conditions, he states that the rivers at the head of the lake were far from satisfactory. There was a light run to them all, as was the case in both 1916 and 1917. The other tributaries of the lake were as well seeded as in any season in recent years. The size of the sockeye observed in all tributaries coincided with the bi-weekly tests made at the canneries. They averaged but little over 5 lb. each, being smaller than in former seasons at Rivers Inlet.

Smith Inlet.—The spawning-bed of the Smith Inlet sockeye was inspected by Fishery Overseer A. W. Stone. The exceptionally poor run of sockeye to Smith Inlet this season demonstrates the merit of the warning given by Mr. Stone in his report of spawning conditions in 1916 and 1917, the two brood-years of the 1921 run. Conditions this year show how serious the situation at Smith Inlet has become. Notwithstanding that drag-seines are no longer used in the inlet, so many gill-nets were used this season, with the result that the spawning-beds were very poorly seeded.

The Nass River.—The spawning-beds of the Meziadin Lake section of the Nass River were again inspected by Inspector of Fisheries C. P. Hickman. He was accompanied by Overseer J. M. Collison, of the Dominion service, who has repeatedly visited the section. In comparing the run of sockeye to the Meziadin watershed for 1921 with former years, Inspector Hickman is of the opinion that there were more fish to be seen in the lake than usual, but far less at the falls en route to the lake than in the years 1919 and 1920. Conditions at the fishway at the falls in the Meziadin River were fairly satisfactory. The basins of the fishway, however, are fast filling with gravel and should be cleaned out. Observations in the Nass basin have largely been confined to the Meziadin section. The Bowser Lake section has not been visited since the year of its discovery—1912—because access to that lake is most difficult. It is unquestionably a very important spawning section of the Nass and more information as to conditions there is necessary to a comprehensive study of spawning conditions. The lack of information as to conditions in that section has always been the weakness of the reports on the spawning area of the Nass.

The Skeena River.—The spawning-beds of the Skeena River basin were again inspected this season by Fishery Officer Gibson. He reports that the Dominion fishery officials from the Stuart Lake Hatchery, Fraser basin, again collected sockeye-eggs at 15-Mile and Pierre Lake Creeks, at the head of Babine Lake. The run to that section compared favourably with former years. Stuart Lake Indians caught and smoked some 7,000 sockeye taken from the stream at that end of Babine Lake.

Conditions at the hatchery at the outlet of Morrison Lake were most promising. The hatchery was filled with sockeye-eggs and natural propagation is reported greater than usual. Sockeye in large numbers entered this section in June. The retaining-ponds at the hatchery were well filled with vigorous fry of last season's hatch.

The beds of the Skeena at the outlet of Babine Lake and the Indian smoke-houses located there displayed very few sockeye. The Indians stated that the number of sockeye that passed there this year was so small that they had been unable to obtain their usual supply. From their account the run was much below the average of recent years. Reports of the run of sockeye up the Bulkley River this year are more satisfactory than in recent years.

Major J. A. Motherwell, Dominion Chief Inspector of Fisheries in the Province, supplied the following statement showing the number of salmon-eggs placed in each of the hatcheries of the Province in 1921:—

COLLECTION OF SALMON-EGGS, BRITISH COLUMBIA, 1921.

Hatchery.	Salmon.					Totals.
	Sockeye.	Cohoe.	Humpback.	Spring.	White Spring.	
Anderson Lake	10,033,200	.....	.....	.....	.....	10,033,200
Babine Lake	6,090,000	.....	.....	.....	.....	6,090,000
Cowichan Lake	.....	1,227,800	.....	1,507,300	9,000	2,744,100
Cultus Lake	4,306,200	.....	.....	.....	.....	4,306,200
Harrison Lake	727,000	.....	4,515,000	937,000	.....	6,179,000
Kennedy Lake	1,854,000	82,950	.....	.....	.....	1,936,950
Pemberton	26,053,000	.....	.....	.....	.....	26,053,000
Pitt Lake	2,680,750	.....	.....	.....	.....	2,680,750
Rivers Inlet	18,374,400	.....	.....	.....	.....	18,374,400
Skeena River	4,286,000	4,000	396,000	.....	.....	4,686,000
Stuart Lake*	5,530,000	.....	.....	.....	.....	5,530,000
Totals	79,934,550	1,314,750	4,911,000	2,444,300	9,000	88,613,600

* Eggs collected from the Skeena River basin.

APPENDICES.

CONTRIBUTIONS TO THE LIFE-HISTORY OF THE SOCKEYE SALMON. (No. 7.)

AN ANALYSIS OF THE RUNS OF SOCKEYE TO THE PRINCIPAL RIVERS OF BRITISH COLUMBIA IN 1920 AND 1921.

By Charles H. Gilbert, Ph.D., Professor of Zoology, Stanford University.

THE FRASER RIVER SOCKEYE RUN OF 1920.

The total pack of Fraser River sockeye in 1920 amounted to 111,053 cases, and showed little change from the packs of 1916 (116,783) and 1919 (103,200). The season of 1918 (71,572) still shows the river at its lowest ebb, while 1917 (559,702) exhibited the last remains of the former big years of the Fraser River cycle. The average pack for the three years 1916, 1919, and 1920 is 110,345 cases, so the condition of the run seems neither to have improved nor deteriorated within that period, unless, perhaps, an improvement is shown in 1920 by the better condition of the spawning-grounds, as reported by Mr. Babcock in a previous bulletin.

(1.) The One-year-in-lake Type.

The small number of three-year grilse occurring in the run of 1920, and the bearing of this fact on the probable size of the run in 1921, has already been discussed by us in the Commissioner's Report for 1920, page 27. The three-year males, to which we apply the term "grilse," always belong to the prevailing Fraser River group, characterized by having spent one whole year in fresh water before passing down to the sea. The other members of this group mature either in their fourth or in their fifth years, the four-year contingent predominating always in this river-basin. An analysis of the prevailing one-year-in-lake group for the year 1920 is given in the following table, based on over 1,700 individuals taken by random sampling on twenty-six different days, well-spaced throughout the run. They were captured in traps along the southern shore of Vancouver Island and were examined at the Esquimalt Cannery of J. H. Todd & Sons, to whom our thanks are due for many courtesies.

Table I.—Fraser River Sockeyes from Vancouver Island Traps, 1920, One Year in Lake, grouped by Age, Sex, and Length.

Length in Inches.	Number of Individuals.			
	Four Years old.		Five Years old.	
	Males.	Females.	Males.	Females.
19	3	1	..	..
19½	1	5	..	1
20	4	3	1	..
20½	17	10	..	..
21	2	6	..	..
21½	7	26	1	..
22	11	40	1	3
22½	34	104	2	2
23	56	142	2	9
23½	105	118	3	15
24	141	137	11	45
24½	144	50	17	42
25	73	17	26	44
25½	54	3	28	29
26	19	1	22	11
26½	2	..	34	11
27	..	..	23	2
27½	1	..	11	1
28	..	..	3	..
28½	1	..	2	..
29	..	..	1	..
Totals	658	663	188	215
Totals each group	1,321		403	
Average lengths	24.1	23.2	25.7	24.6

As is shown in the above table, the four-year fish in 1920 constituted 77 per cent. and the five-year fish 23 per cent. of the one-year-in-lake group. These percentages have remained practically the same since the Fraser run definitely declined to its present low rate of production, in 1916. Prior to that date the proportions of four- and five-year sockeyes in successive runs fluctuated widely. To illustrate this phase of the history of the river, we give below a list of all except the big years since 1912, with the number of cases of sockeyes packed each year and the percentage of four-year fish:—

	Cases.	Per Cent.
1912	325,451	90
1914	555,557	85
1915	155,714	61
1916	116,783	76
1918	71,572	77
1919	103,200	76
1920	111,053	77

From this it appears the four-year percentage has varied only between 76 and 77 in 1916, 1918, 1919, and 1920. But these figures represent averages for the entire season, while in each of the above years a wide range occurred during the course of the run. In the following table we specify the percentages of four- and five-year sockeyes found in each sample taken during the season of 1920. The four-year fish range from 57 per cent. at the beginning of the run to 97 per cent. in the middle of July, and then during the height of the run, including the last week of July and the first half of August, the percentage characteristic of the entire season is attained. Considering the entire series, we find it easily divisible into three or possibly four periods. From June 14th to July 2nd the four-year sockeyes average 65 per cent.; from July 5th to July 19th they average 90 per cent.; and for the remainder of the run they average 75 per cent. A minor division seems indicated at August 11th, with 74 per cent. characterizing the run from that date to July 22nd, and 79 per cent. from August 11th to the 30th. That these varying percentages are characteristic of special stream-colonies found in the river during definite portions of the run, or of groups of colonies that enter the river together, admits of no question. Divisions of the season similar to those indicated above have been proposed on the same basis during previous years.

Table II.—Percentages of Four- and Five-year Fraser River Sockeyes, 1920 Run, One Year in Lake, occurring on Different Dates.

Date.	Four-year Fish.	Five-year Fish	Specimens examined.
June 14	57	43	105
„ 15	79	21	94
„ 23	69	31	80
„ 28	57	43	91
July 2	63	37	90
„ 5	84	16	57
„ 9	90	10	96
„ 13	97	3	97
„ 16	92	8	101
„ 19	89	11	90
„ 22	77	23	74
„ 28	76	24	72
„ 30	65	35	60
Aug. 2	80	20	89
„ 4	67	33	55
„ 6	76	24	46
„ 9	67	33	66
„ 11	76	24	91
„ 13	80	20	49
„ 16	80	20	40
„ 18	78	22	51
„ 20	80	20	35
„ 23	82	18	51
„ 25 to 30	80	20	49

The relative numbers of males and females in the different year-groups is a comparatively constant feature in each river-basin, but varies appreciably in different races of sockeyes. It thus rises to the dignity of a racial character. In our record of the Fraser River runs for a series of years the males and females of the four-year fish, and also the five-year fish, are approximately equal in number. This condition contrasts strikingly with that found in Rivers Inlet, where each year it is seen that four-year males are much in excess of four-year females, while the five-year females are more numerous than the five-year males. The 1920 run to the Fraser River was no exception in this regard, the four-year males and females being practically in equal numbers, while the male five-year fish were 47 per cent. of the five-year group. Taking both four- and five-year groups together, the males constituted 49 per cent. of the run.

The lengths of both four- and five-year fish in 1920 were below the average for this river-basin. In 1919 we called attention to the same condition prevailing in that year. The average lengths of the four-year males during five years prior to 1919 was 25 inches, and of the four-year females during the same period 24.1 inches. But in 1919 the males averaged 24.1 and the females 22.8 inches; and in 1920, 24.1 and 23.2 inches. In the recent reduction of the Fraser River sockeye run the smaller sizes characteristic of one or more tributaries may have suffered less extensively than the larger sizes, which could not pass through the meshes of the gill-nets. The smaller races may be in larger proportion than formerly, and thus pull down the average for the run.

In our reports for the years 1917, 1918, and 1919 we have presented tables showing increase in average size during the progress of the season, in each year-group, the later fish being appreciably larger than are the first to run. As this increase in size during the season does not occur in Rivers Inlet, where the average size remains approximately the same or actually diminishes toward the close of the run, the matter merits attention.

(2.) THE TWO-YEARS-IN-LAKE TYPE.

In our previous reports we have called attention to the regular appearance of this type in certain portions of the Fraser River run and its virtual absence on other dates. Compared with the other groups present, it may vary widely in abundance in different years, but the parts of each run characterized by its presence agree closely in successive seasons. A regular schedule is maintained year after year. Samples of the run taken in June always contain representatives of this class. They diminish in numbers or entirely disappear in July and then reappear in greater abundance in August. This unequal distribution in the run suggests a like inequality among the various tributaries of the Fraser. And such, in fact, we have found. In certain colonies they are apparently wholly absent, or are very rare. In other colonies they are comparatively abundant. Their presence in any portion of the run can be accepted as evidence that some colony is then entering the river bound for a tributary which normally contains them. An intensive study of this type, including its growth characteristics and its distribution within the run and throughout the river-basin, would promise to throw much light on the inner constitution of the run itself. Evidence accumulates that the colonies bound for different tributaries enter the river in regular order and on comparatively constant dates. Year by year, relatively to the other colonies, they seem to maintain their proper place in the procession.

In the following table we bring together our determinations of the percentages of this type which we have made for different dates in the runs of 1916, 1919, and 1920. In both 1916 and 1920 the two-years-in-lake type was running in moderate fashion during the later part of June and almost wholly disappeared in July, to again appear in August. The June run of this type in 1920 began unusually late (none were seen among nearly 300 specimens examined June 14th, 15th, and 23rd), and the August run exceeded in intensity anything hitherto reported.

Six-year fish of this type are never abundant in the Fraser basin. In 1920 but three individuals were encountered in nearly 2,000 examined. Two of these appeared June 28th, the date on which the first five-year fish of this class were taken; the third was obtained July 2nd. All three were male fish, 24½, 26, and 26½ inches long.

A second table gives the distribution of lengths among males and females of this group. The average lengths are practically identical with those of the one-year-in-lake class one year younger. The additional year spent in the lake greatly increases the hazards of this class and gives them no advantage in final size in the Fraser basin.

Table III.—Percentages of Two-years-in-lake Type on Different Dates of the Run.

Date.	1916.	1919.	1920.
June 2	..	..	..
„ 8	1.5	..	..
„ 9	1.5	10	..
„ 15	10	..	..
„ 17	..	18	..
„ 22	11	..	..
„ 26	..	16	..
„ 28	15	..	8
July 2	..	11	8
„ 5	..	..	5
„ 9	..	..	4
„ 11	1.5	..	..
„ 13	..	..	1
„ 15	..	10	..
„ 16	..	..	..
„ 17	0.5	..	..
„ 19	..	..	1
„ 20	..	..	..
„ 22	..	..	..
„ 25	..	..	..
„ 27	1.7	..	..
„ 28	..	..	4
„ 30	2.5	..	3
Aug. 2	..	..	3
„ 4	..	..	2
„ 6	1.6	..	..
„ 8	..	..	..
„ 9	..	..	11
„ 10	8.5	..	2
„ 11	..	..	..
„ 13	..	..	4
„ 16	..	..	13
„ 18	..	..	14
„ 20	..	..	23
„ 23	..	..	24
„ 25	..	..	33
„ 27	10	..	45
„ 30	..	..	33

Table IV.—Fraser River Sockeyes from Vancouver Island Traps, 1920, Two-years-in-lake Type.

Length in Inches.	Number of Individuals.			
	Five Years old.		Six Years old.	
	Males.	Females.	Males.	Females.
20	..	1	..	..
20½	..	..	..	..
21	..	2	..	..
21½	..	1	..	..
22	1	2	..	..
22½	..	9	..	..
23	8	18	..	..
23½	8	11	..	..
24	10	12	..	..
24½	8	3	1	..
25	14	1	..	..
25½	5	1	..	..
26	2	1	1	..
26½	..	..	1	..
Totals	56	62	3	..
Average lengths	24.3	23.2	25.7	..

(3.) THE SEA-TYPE.

As throwing additional light on the definite schedule of events which characterizes the Fraser River run of sockeyes, we again note that the run of individuals which had proceeded to sea shortly after hatching, and as soon as they became free-swimming, did not begin in this year until after the middle of July. The first capture in 1920 was on July 19th. In 1916 the first was observed on July 17th, and in 1918 on July 14th. In 1919 one occurred very exceptionally on June 9th, but as none appeared between that date and July 15th, and they appeared daily after that date, July 15th is properly to be selected as the beginning of the run in 1919. So close a chronology as July 14th, 15th, 17th, and 19th for the first appearance of the fish of this type in the runs of four different years is striking evidence of the regularity with which the run is conducted year by year. Individuals of sea-type and those of the two-years-in-lake type are the only ones that can with certainty be recognized always in a composite assemblage, such as that which comprises the Fraser River run. Could we detect locality groups as unerringly and segregate them from the general mass, we cannot doubt that they too would appear in regular sequence and on fairly regular dates.

The sea-type in 1920 occurred daily after its first appearance, and most numerously from July 22nd to August 13th. Fifty-three specimens were included in our material, distributed among three- and four-year groups, as shown in the following table:—

Table V.—Fraser River Sockeyes, Sea-type, 1920.

Length in Inches.	Number of Individuals.			
	Three Years old.		Four Years old.	
	Males.	Females.	Males.	Females.
20	..	1	..	..
20½	..	..	..	..
21	2	4	..	..
21½	1	3	..	..
22	..	1	..	1
22½	3	1	..	..
23	4	1	..	1
23½	7	1	..	1
24	2	..	2	1
24½	1	1	..	1
25	3	..	..	1
25½	..	..	2	2
26	..	..	3	1
26½	..	..	..	..
27	..	..	1	..
Totals	23	13	8	9
Average lengths	23.3	21.8	25.5	24.3

THE FRASER RIVER SOCKEYE RUN OF 1921.

The total pack of sockeyes bound for the Fraser River in 1921 was 142,598 cases, 39,631 packed in British Columbia and 102,967 on Puget Sound. The Puget Sound figures include also sockeyes bound for the Skagit River, in the State of Washington. These run earlier in the season than the Fraser River sockeyes and are known to be somewhat inferior to the latter in quality. But no attempt has been made to determine the size of the Skagit River run and we have no data which would enable us to segregate the two. It is not believed, however, that the Skagit pack attains any considerable size.

As a lineal descendant of the series of quadrennial big years of the Fraser, 1921 possesses a special interest. Some traces of its origin are discernible. In size the run ranks somewhat above the very low estate of the recent small years, among which we must go back to 1915 to find as large a pack. It diverges also from the recent small years which precede it in the limited number of the five-year group which were present. It will be recalled that in 1913,

before the big year had suffered any reduction in numbers, it was made up essentially of four-year fish. Diligent search was necessary at that time for the detection of any five-year individuals. The run was derived from eggs laid down the previous big year, four years before, and contained no contributions of consequence from any other year. Five-year individuals were of course present in numbers which would have made them conspicuous in a small year, but they were "concealed by the vast hordes of four-year-olds, the progeny of the last big run."

This condition must have characterized all the big years until 1917, when the run was cut to a fourth or a fifth of its previous dimensions. This reduction had not affected the five-year contingent of that run, for the five-year fish of 1917 had been spawned in 1912, before the catastrophe that had closed the canyon to the ascent of salmon. They were present in their usual numbers and were associated with so reduced a body of four-year fish that their presence was easily discovered. In the earlier and in the latter part of the run, in fact, the five-year fish in 1917 attained considerable proportions in the run; on June 16th, 66 per cent.; June 25th, 37 per cent.; June 28th, 20 per cent.; and July 4th to 14th, 4 or 5 per cent. After this date, throughout July, the number was reduced to 1 per cent. or less, but rose again on August 6th, and from that time on to the conclusion of the run maintained an average of 8 per cent. The total number of four-year fish contained in our twenty-one samplings, well distributed throughout the run, amounted to 94 per cent. and the five-year fish to 6 per cent. of the total of both groups.

With 1917 we can now compare 1921, which also began the season with a high percentage of five-year fish, which then decreased rapidly to the early part of July and increased again toward the last of the run. From June 9th to the 20th the five-year fish in our samples comprised 56 per cent.; on June 27th, 41 per cent.; on June 30th, 17 per cent. From July 4th to August 9th the percentages of thirteen samples averaged 11 per cent. and from August 11th to the 31st 19 per cent. of the members of both groups. The total number of individuals examined in both age-groups was 997, with 84 per cent. four-year fish and 16 per cent. in the five-year class.

It will be recalled that prior to 1921 a series of the small years had exhibited a remarkable uniformity in the relative sizes of their age-groups. In 1916, 1918, 1919, and 1920 the percentage of four-year fish was either 76 or 77. In 1917, with a recognizable remnant of the big-year series still persisting, the percentage of four-year fish rose to 94 per cent. in approximation of 1913, when it was 99; and in 1921, when a faint vestige of the big-year cycle still can be traced, the percentage drops to 84, but is still well above the small years with which it is associated.

In the following table we present an analysis of the one-year-in-lake type, the only one which has any considerable economic importance in the Fraser run. In 1921, as in 1920, the females in both year-groups were somewhat in excess of the males, 52 per cent. of the four-year group and 58 per cent. of the five-year group.

The lengths of the four-year fish exhibit a still further decline in 1921. The tendency has been marked since 1919, as appears below:—

	Males.	Females.
Average lengths for five years prior to 1919	25.0	24.1
Lengths in 1919	24.1	22.8
Lengths in 1920	24.1	23.2
Lengths in 1921	23.7	23.0

A similar reduction in size has been observed during the declining years of the Rivers Inlet fishery. The further history of this tendency will be a matter of interest.

Table VI.—Fraser River Sockeyes from Vancouver Island Traps, 1921, One Year in Lake, Grouped by Age, Sex, and Length.

Length in Inches.	Number of Individuals.			
	Four Years old.		Five Years old.	
	Males.	Females.	Males.	Females.
18½	..	2	..	..
19	..	1	..	..
19½	..	1	..	..
20	1	2	..	..
20½	2	1	..	..
21	8	4	..	..
21½	5	16	..	1
22	16	55	1	3
22½	38	83	..	1
23	62	112	1	2
23½	72	79	5	6
24	72	53	1	15
24½	56	18	1	21
25	40	5	5	20
25½	14	2	4	10
26	11	2	23	11
26½	6	..	9	1
27	..	..	9	..
27½	..	1	4	..
28	..	..	2	..
28½	..	..	1	..
Totals	403	437	66	91
Total each group	840		157	
Average lengths	23.7	23.0	25.9	24.6

We have not included in the above table five representatives of the one-year-in-lake group, which matured at the age of three and were all males. These precocious males, to which we apply the term "grilse," are never relatively abundant. They represent always a very small percentage of the brood to which they belong. Five is an unusually large number to find among a thousand individuals, now that the big year has vanished. None appeared in the run prior to July 28th. One was 18½, the other four were 19 inches long, and they weighed 3 to 3½ lb.

Two-years-in-lake Group.

This group was sparsely represented in the run of 1921, but exhibited clearly the peculiar distribution within the period of the run that we have commonly observed in the Fraser. The group was in evidence, although in small numbers, throughout the month of June, but became very rare in the early half of July. Our samples taken on July 8th, 11th, and 15th contained only 2 per cent. of this group, and samples taken on July 18th, 21st, 25th, and 28th are wholly without any individuals that had spent their first two years in their native lake before passing out to the sea. On August 1st representatives of the group reappeared, more abundantly than in June, and were then present in each of our samples taken throughout the month of August. On August 15th they constituted 11 per cent. of the run. It seems probable that the early-running members of this group belong with colonies which are bound well up-stream beyond the Yale Canyon, perhaps to the Chilcotin, while the members of the August run are bound for one or more of the tributaries below the canyon. Our samples in 1921 contained fifty-one examples of the two-years-in-lake type, forty-four of which were in their fifth year and seven in their sixth year.

The Sea-type.

The first ten of our samplings, covering the entire month of June and the first half of July, were without any members of this group. The first one was observed July 18th and one or more

specimens appeared in each of our numerous samples taken after that date. 1921 agrees closely with other years in which we have observed the first appearance of this group in the run. In 1916 we recorded the first individual on July 17th and in 1919 on July 19th. Of the twenty-eight specimens examined in 1921, six were in their third year and twenty-two in their fourth year.

THE RIVERS INLET SOCKEYE RUN OF 1920.

(1.) General Characteristics.

In our previous report in this series (Report of the Commissioner of Fisheries, 1919, page 52) we commented on the prospects for 1920, calling attention to the fact that the two brood-years which would be responsible for the run of 1920 exhibited a wide disparity. The five-year fish of 1920 would be derived from eggs laid down in 1915, when the pack of Rivers Inlet sockeyes exceeded 130,000 cases and was the largest ever put up in this district. The four-year fish, on the contrary, would be descendants of 1916, with a pack of less than 45,000 cases, the smallest of any recent year. We remarked: "The results during 1920 will possess more than usual interest, for in the two brood-years of that season we find contrasted, as above indicated, the very poorest and the very richest years of which we have record. It will be most interesting to observe whether the five-year age-group will appear in 1920 in overwhelming proportions." Such, in fact, as will appear, turned out to be the case. The run was gratifyingly large after a series of four very poor years, and it was practically all derived from 1915, the proportion of four-year fish (5 per cent. of the total) being so small as to be negligible. Some 115,000 of the 121,000 cases of the 1920 run were results of the 1915 brood, and approximately 26,000 cases of the 1919 pack were composed of four-year fish from the same great brood of 1915. If we assume that the packs of these two years give reliable indications of the size of the runs, then the four-year fish that developed from the 1915 brood represented 18 per cent. and the five-year fish 82 per cent. of the total progeny of that brood. It is facts of this nature that lead us to call the Rivers Inlet cycle predominantly one of five years, in contrast to the Fraser River cycle, well known to be one of four years.

(2.) Age-groups, Lengths and Weights.

Among 596 individuals examined, distributed well throughout the run, only thirty-one were in the fourth year, a number too small to be available for statistical treatment. It is interesting to note, however, that the usual changes in the constitution of the run are indicated by this very limited material. Although no samples were secured later than July 23rd, it is seen that more four-year fish were appearing on the later dates. The numbers are as follows: June 29th, 1; July 2nd, 5; 5th, 3; 9th, 3; 13th, 3; 16th, 2; 20th, 9; 23rd, 5. The males, as usual, are in excess of the females, only eight females (26 per cent.) being present.

Because of the small numbers of four-year individuals examined, the average lengths and weights for this group would be wholly unreliable. The five-year males average 26 inches and the females 25 inches in length, and are practically identical in size with the same year-groups in 1915 (26 and 25.1 inches), which was the brood-year for these fish. We have called attention heretofore to the fact that with diminishing runs in Rivers Inlet the size of the fish was also decreasing. No cause is known for such a coincidence, but it is interesting to observe that the size of the individuals promptly recovered in a year of a good run.

Table VII.—Rivers Inlet Sockeyes, Run of 1920, grouped by Length, Age, and Sex.

Length in Inches.	Number of Individuals examined.			
	Four Years old.		Five Years old.	
	Males.	Females.	Males.	Females.
19½	..	..	..	..
20	1	..	..	..
20½	2	..	..	..
21	7	..	1	..
21½	4	1	..	..
22	3	1	2	3
22½	2	2	3	4
23	..	2	5	6
23½	..	2	5	18
24	3	..	15	36
24½	1	..	17	50
25	..	..	30	61
25½	..	..	29	43
26	..	..	43	43
26½	..	..	37	20
27	..	..	35	9
27½	..	..	23	2
28	..	..	17	..
28½	..	..	5	1
29	..	..	4	..
Totals	23	8	271	296

Table VIII.—Rivers Inlet Sockeyes, Run of 1920, grouped by Weight, Age, and Sex.

Weight in Pounds.	Number of Individuals examined.			
	Four Years old.		Five Years old.	
	Males.	Females.	Males.	Females.
3	..	..	..	..
3½	1	..	..	..
4	4	1	1	..
4½	7	1	4	1
5	2	1	7	17
5½	1	5	9	32
6	3	..	21	66
6½	..	..	32	50
7	..	..	35	55
7½	..	..	42	33
8	..	..	42	27
8½	..	..	28	10
9	..	..	21	5
9½	..	..	14	..
10	..	..	10	..
10½	..	..	3	..
11	..	..	..	..
11½	..	..	2	..
Totals	23	8	271	296

Table IX.—Five-year Rivers Inlet Sockeyes, 1920, showing Length Frequency Distribution through the Season.

Inches.	Males.									Females.								
	June 29.	July 2.	July 5.	July 9.	July 13.	July 16.	July 20.	July 23.	Total.	June 29.	July 2.	July 5.	July 9.	July 13.	July 16.	July 20.	July 23.	Total.
21	..	..	..	..	..	..	..	1	1	..	..	..	..	..	..	..	..	..
21½	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
22	..	1	..	..	..	..	..	1	2	..	..	..	..	1	1	..	1	3
22½	..	2	..	..	..	..	..	1	3	..	..	1	1	..	1	..	1	4
23	..	1	2	..	..	1	..	1	5	..	..	2	1	1	..	2	..	6
23½	..	..	1	1	1	2	..	..	5	2	2	1	1	1	4	2	5	18
24	2	2	1	2	4	1	2	1	15	2	4	4	3	5	3	5	10	36
24½	2	4	2	1	3	1	..	4	17	4	2	3	6	10	7	12	6	50
25	6	4	2	5	3	5	4	1	30	5	5	3	5	8	7	11	17	61
25½	5	3	3	3	3	5	5	2	29	4	9	8	5	4	5	3	5	43
26	6	8	2	9	6	5	3	4	43	7	2	4	8	4	9	5	4	43
26½	8	2	8	5	4	4	3	3	37	..	1	5	7	1	3	1	2	20
27	8	5	7	2	6	1	5	1	35	..	1	2	2	1	1	2	..	9
27½	6	6	5	2	4	..	..	..	23	1	..	1	..	..	..	..	..	2
28	3	3	2	1	2	6	..	..	17	..	..	..	..	..	..	..	..	..
28½	1	1	1	1	..	..	1	..	5	..	..	..	1	..	..	..	..	1
29	1	1	1	1	..	..	..	..	4	..	..	..	..	..	..	..	..	..
Totals..	48	43	37	33	36	32	23	19	271	25	26	35	39	36	41	43	51	296

Table X.—Average Lengths in Inches of Rivers Inlet Sockeyes, 1920, in Fifth Year, on a Series of Dates.

	June 29.	July 2.	July 5.	July 9.	July 13.	July 16.	July 20.	July 23.
Males	26.4	25.9	26.3	26.0	25.9	25.8	25.9	25.0
Females	25.2	25.1	25.4	25.4	24.8	25.0	24.9	24.7

Not only is no increase in length shown with advancing season in the above table, but there is evident in the later dates a run of fish of distinctly inferior size. A discussion of this subject appears later in this paper under the run for 1921.

(3.) PROPORTIONS OF THE SEXES.

As we have already indicated, the four-year class was so sparsely represented in 1920 that no statistics of any value can be obtained from it. Males were more abundant than females in our few samples, as is always the case in this race of sockeyes, but the percentages (74 per cent. males, 26 per cent. females) has no significance for the reason stated.

In the case of the five-year group we find the rates of males to females varying widely through the season, the males, as usual, showing the highest percentages early in the run. Samples were procured on eight days, spaced three or four days apart, the earliest date being June 29th, the latest July 23rd. For these eight dates the percentages of male five-year fish ran: 66, 62, 51, 46, 50, 44, 35, 27. The average of these percentages is 48 per cent. males and 52 per cent. females, and these percentages hold also for the total number of males and females (271 males, 296 females) taken during the season.

THE RIVERS INLET SOCKEYE RUN OF 1921.

(1.) GENERAL CHARACTERISTICS.

After presenting nearly a maximum pack in 1920 (121,254 cases) the Rivers Inlet sockeye run declined in 1921 to the lowest level, with one exception, since the industry has become well established. The exception occurred in 1916, and it is worthy of consideration that a five-year period is thus seen to have intervened between the two lowest packs the river has produced. A five-year period also separated the generous run of 1920 from the record pack of the river, which occurred in 1915 and was in excess of 130,000 cases; and another period of five years between 1915 and the season of 1910, with its 126,000 cases. The three largest sockeye-packs on the river are thus seen to be separated by five-year intervals, as though one were the direct descendant of the other. Inasmuch as the Rivers Inlet cycle is prevailingly one of five years—a larger proportion of the fish maturing in their fifth than in their fourth year—the above-noted coincidences seem reasonable and lead us to arrange other recent years in similar five-year sequences and observe the results.

We give below, in even thousands of full cases, the packs since 1907, arranged in accordance with the five-year cycle:—

1907..... 87,000	1912.....112,000	1917..... 61,000
1908..... 64,000	1913..... 61,000	1918..... 53,000
1909..... 89,000	1914..... 89,000	1919..... 56,000
1910.....126,000	1915.....130,000	1920.....121,000
1911..... 88,000	1916..... 44,000	1921..... 46,000

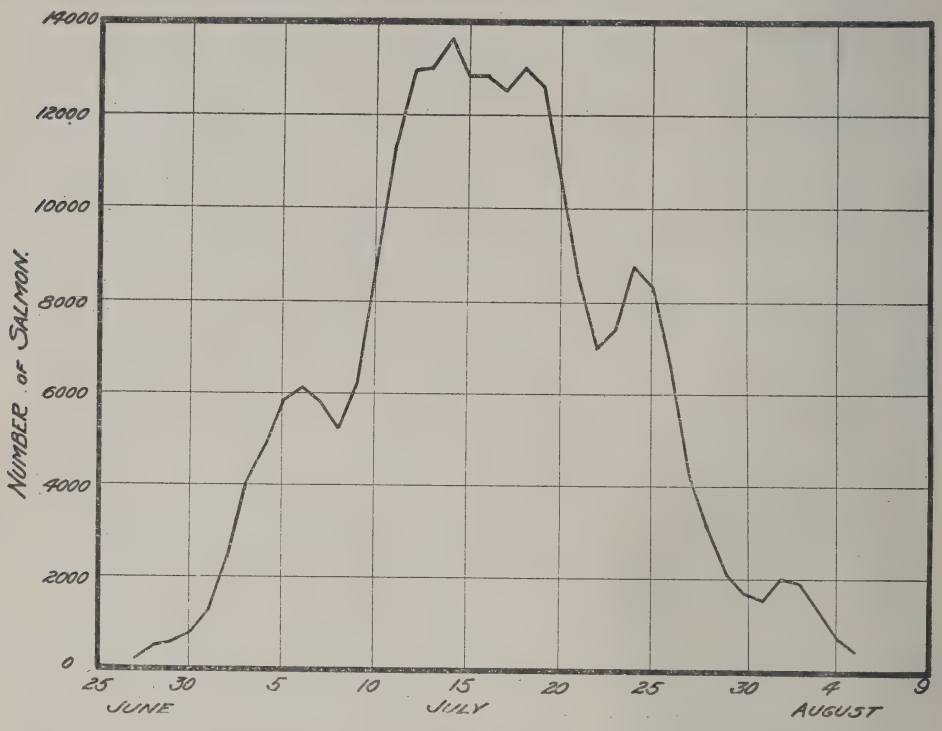
That a certain consistency marks these series of related years is not to be questioned, and is only faintly obscured by the obvious impoverishment which the river has suffered during the last five-year period and which began in less marked degree even during the preceding period. The product of the first five-year period was 454,000 cases; of the second, 436,000 cases; of the third, 337,000 cases. From an inspection of these figures it seems reasonable to conjecture that fishing operations during the period 1912 to 1916 had become more concentrated and effective than in the previous cycle, and that there was captured for commercial purposes a larger proportion of the runs than had previously been the case. This would tend to obscure such reduction in the runs as had already occurred, and would prepare for the impressively serious decline during the following five-year period.

To what extent the future will approve a five-year cycle in Rivers Inlet only the future can disclose. If predictions during the fifteen years above listed had been based on the fifth year preceding, but one surprise would have been experienced, that of the exceptional year 1912, when the pack of 112,000 cases was seemingly without competent ancestors and left no worthy descendants. Such other changes as are evident in the cyclical series can be properly ascribed to the progressive decline in the runs.

During previous years we have sought to investigate the internal constitution of the annual sockeye run by means of samples collected at more or less equal intervals throughout the season. By this means we have endeavoured to ascertain the comparative sizes of the year-groups, the relative proportions of the sexes, and the size distribution of males and females among the various classes. An obvious source of possible error in our method lay in treating all the various samples as contributing data of equal importance for determining the total constitution of the run, whereas the earlier and later samples were taken when the number of individuals running was very small, while some of the intermediate takes sampled the run at its maximum. It becomes of importance, therefore, to ascertain the course of the run throughout the season. If it develops symmetrically, with its peak midway of the season and its advance and decline similar in degree, our method of sampling will produce reliable results with regard to all factors which are constant and those also which vary progressively in the same direction and with equal pace.

To throw light on the course of the run, we have obtained through the co-operation of Fisheries Overseer Stone the daily sockeye-catch at three of the Rivers Inlet canneries during the season of 1921. We have taken the total daily catch of the three canneries in even hundreds,

have smoothed the series once by threes, and present the results in the following graph. Considering the nature of the data, which are affected by weather conditions and the weekly closed season, the symmetrical development of the run clearly appears.



Magnitude of the sockeye-salmon run throughout the season of 1921, measured by the receipts at the canneries.

(2.) THE AGE-GROUPS.

The Rivers Inlet run in 1921, as in previous years, consisted almost entirely of two age-groups, those that matured in their fourth and those that matured in their fifth year. In both of these groups the early history is the same, the initial year of their lives being spent in fresh water, descent to the sea taking place early in the second spring. Among nearly a thousand individuals examined in 1921, only one was found which had spent two growing seasons in the lake, maturing then in its fifth year. This type is abundant in many river-basins. Its almost total absence in the Owikeno River may conceivably be due to the same adverse feeding conditions which apparently dwarf the fingerlings in this stream during their first season.

The relative proportions of the four- and the five-year groups is a constantly varying one throughout the season. In the majority of the years the older group predominates strongly during the early part of the run, but loses more or less of its advantage over the four-year group with the advancing season. In exceptional years we have witnessed a reversal of this procedure, the four-year fish relatively decreasing and the five-year fish increasing toward the close of the run. The following table gives our experience in this regard from 1915 to 1921. During four of the six years the five-year fish were relatively most abundant during the early part of the run. This was the case in 1921.

Table XI.—Percentages of Five-year Rivers Inlet Sockeyes appearing at Different Dates from 1915 to 1921.

Date.	1915.	1916.	1917.	1918.	1919.	1921.
June 27	..	93	..	7	..	..
„ 28	..	..	..	..	..	77
„ 29	..	92	..	19	..	..
„ 30	..	..	..	..	..	56
July 1	..	..	..	..	..	..
„ 2	..	..	..	25	..	66
„ 3	..	..	..	..	..	..
„ 4	..	90	94	32	..	..
„ 5	79	..	..	..	..	51
„ 6	..	..	..	..	..	..
„ 7	..	..	..	..	65	48
„ 8	..	..	..	..	..	..
„ 9	..	..	..	..	..	..
„ 10	..	..	88	37	47	..
„ 11	..	84	..	..	..	48
„ 12	..	..	..	64	..	..
„ 13	..	76	82	..	..	..
„ 14	..	..	..	..	..	..
„ 15	84	..	..	..	66	..
„ 16	..	..	70	59	..	47
„ 17	..	..	..	..	..	..
„ 18	..	72	..	..	67	57
„ 19	..	..	..	69	..	40
„ 20	..	..	..	..	..	..
„ 21	84	69	59	..	..	..
„ 22	..	..	..	..	52	..
„ 23	..	..	..	44	..	..
„ 24	..	..	73	..	..	..
„ 25	..	78	..	..	..	..
„ 26	..	..	..	59	55	..
„ 27	..	68	..	..	..	36
„ 28	88	..	41	..	..	..
„ 29	..	..	..	..	..	44
„ 30	..	..	..	54	..	..
„ 31	..	..	46	..	55	..
Aug. 1	..	..	..	..	..	53
„ 2	92	60	..	..	32	..
„ 3	..	..	44	..	..	..
„ 4	..	53	..	..	..	38

We have noted in our reports of previous years that the more prosperous seasons in Rivers Inlet tend to be distinguished by larger percentages of the older year-group. The year 1921 was no exception to this general rule. Taking the total number of all our samples, obtained on thirteen different dates, well spaced during the continuance of the run, we find the five- and four-year groups in approximately equal numbers, the former constituting 51 per cent. and the latter 49 per cent. of the run. The following table gives the relative size of the age-groups for each year since 1912, with the brood-year from which each age-group was derived:—

Table XII.—Percentages of Four- and Five-year Rivers Inlet Sockeyes in Runs from 1912 to 1921, with Broods from which they were derived.

Run of the Year.	Percentage, Four and Five Years old.	Brood-year from which derived.
1912 (112,884 cases)	5 yrs. 79% 4 yrs. 21%	1907 (87,874 cases). 1908 (64,652 cases).
1913 (61,745 cases)	5 yrs. 20% 4 yrs. 80%	1908 (64,652 cases). 1909 (89,027 cases).
1914 (89,890 cases)	5 yrs. 65% 4 yrs. 35%	1909 (89,027 cases). 1910 (126,921 cases).
1915 (130,350 cases)	5 yrs. 87% 4 yrs. 13%	1910 (126,921 cases). 1911 (88,763 cases).
1916 (44,936 cases)	5 yrs. 76% 4 yrs. 24%	1911 (88,763 cases). 1912 (112,884 cases).
1917 (61,195 cases)	5 yrs. 67% 4 yrs. 33%	1912 (112,884 cases). 1913 (61,745 cases).
1918 (53,401 cases)	5 yrs. 43% 4 yrs. 57%	1913 (61,745 cases). 1914 (89,890 cases).
1919 (56,258 cases)	5 yrs. 54% 4 yrs. 46%	1914 (89,890 cases). 1915 (130,350 cases).
1920 (121,254 cases)	5 yrs. 95% 4 yrs. 5%	1915 (130,350 cases). 1916 (44,936 cases).
1921 (46,300 cases)	5 yrs. 51% 4 yrs. 49%	1916 (44,936 cases). 1917 (61,195 cases).

(3.) Distribution of the Sexes.

It will be seen by the following table that the four-year male sockeyes were much less abundant than usual in 1921 in proportion to the females, and that the five-year males were also notably less abundant. Whereas in most years the total male sockeyes in our samples well exceed the total females of both groups, in 1921 the two sexes were present in almost equal numbers.

Table XIII.—Relative Numbers of Males and Females, Rivers Inlet Sockeyes, 1916 to 1921.

	1916.	1917.	1918.	1919.	1920.	1921.
Average percentages—						
Four-year males	74	75	74	79	74	65
Four-year females	26	25	26	21	26	35
Five-year males	40	42	49	45	48	38
Five-year females	60	58	51	55	52	62
Average total males	52	53	66	58	49	51
Average total females	48	47	34	42	51	49

The distribution of the sexes during the course of the run followed the customary series of changes. Both four- and five-year males show a decided tendency to precede the females, as is shown in the table given below, which presents the percentages of the two sexes separately for each year group on a series of thirteen dates. While the average of all the percentages of four-year males throughout the season is 65, the average for the first four dates is 82 per cent. and for the last four dates 43 per cent. Similarly, the average of all the percentages of five-year males is 38, but the first four dates of the table give an average of 52 per cent. and the last four dates 22 per cent.

Table XIV.—Percentage of Males and Females in Rivers Inlet Sockeyes occurring on Different Dates, Season of 1921.

	June 28.	June 30.	July 2.	July 5.	July 7.	July 12.	July 16.	July 18.	July 19.	July 27.	July 29.	Aug. 1.	Aug. 4.
Four-year males	88	82	80	78	67	67	75	66	76	43	50	40	37
Four-year females	12	18	20	22	33	33	25	34	24	57	50	60	63
Five-year males	57	59	53	38	42	36	51	30	33	15	30	22	21
Five-year females	43	41	47	62	58	64	49	70	67	85	70	78	79

(4.) LENGTHS AND WEIGHTS.

The length and weight frequency distributions are given in the following tables, separately for males and females of each year-group. Comparing with a similar table presented in a previous report for the year 1919, we find the parallelism very close. The four-year males ranged during both seasons from 19½ to 25 or 25½ inches and the four-year females from 20½ to 24½ or 25 inches. The five-year males show an unusual distribution, which is rather clearly bimodal, with a large number of individuals among the larger sizes, from 25½ to 27 inches. An entirely similar curve is formed by the male five-year weights, which are bimodally arranged, with excess of individuals of the heavier size.

Table XV.—Rivers Inlet Sockeyes, Run of 1921, grouped by Lengths, Age, and Sex.

Length in Inches.	NUMBER OF INDIVIDUALS EXAMINED.			
	Four Years old.		Five Years old.	
	Males.	Females.	Males.	Females.
19½	1	..	..	..
20	1	..	..	..
20½	4	1	..	..
21	5	4	1	..
21½	17	16	1	2
22	48	25	2	2
22½	56	48	8	23
23	67	51	12	28
23½	51	20	17	40
24	29	11	17	73
24½	14	1	13	41
25	5	..	15	44
25½	1	..	25	15
26	..	..	24	14
26½	..	..	28	11
27	..	..	21	3
27½	..	..	7	1
28	..	..	1	..
28½	..	..	..	..
29	..	..	2	..
Totals	299	177	194	297

Table XVI.—Percentages of Four- and Five-year Rivers Inlet Sockeyes, 1921, where Lengths overlap.

Length in Inches.	Proportion.	
	Four Years old.	Five Years old.
21	90	10
21½	92	8
22	96	4
22½	77	23
23	75	25
23½	55	45
24	31	69
24½	22	78
25	8	92
25½	2	98

Table XVII.—Rivers Inlet Sockeyes, Run of 1921, grouped by Weight, Age, and Sex.

Weight in Pounds.	Number of Individuals examined.			
	Four Years old.		Five Years old.	
	Males.	Females.	Males.	Females.
3	3	..	..	..
3½	2	1	..	2
4	15	12	..	1
4½	61	61	3	15
5	95	64	16	45
5½	68	28	24	68
6	34	10	26	67
6½	17	1	14	47
7	4	..	24	26
7½	..	..	33	18
8	..	..	22	5
8½	..	..	17	3
9	..	..	10	..
9½	..	..	4	..
10	..	..	1	..
Totals	299	177	194	297

The average lengths and weights are shown below in comparison with previous years. They depart but little from the averages of the eight preceding years, which are given in the last column. The four-year fish are fully up to average length and weight, but the five-year females are notably lacking in both length and weight, and the five-year males only less so.

Table XVIII.—Average Length in Inches of Rivers Inlet Sockeyes for Nine Years.

	1912.	1913.	1914.	1915.	1916.	1917.	1918.	1919.	1921.	Average.
Four-year males ...	23.2	22.9	23.0	22.9	22.9	22.5	22.3	22.4	22.9	22.8
Four-year females ..	22.8	23.0	22.8	22.8	22.8	22.3	22.5	22.3	22.6	22.7
Five-year males ...	25.8	25.9	25.9	26.0	25.8	25.0	24.9	24.8	25.2	25.5
Five-year females ..	24.6	25.2	25.2	25.1	25.0	24.4	24.5	24.4	24.2	24.8

Average Weight in Pounds of Rivers Inlet Sockeyes for Seven Years.

	1914.	1915.	1916.	1917.	1918.	1919.	1921.	Average.
Four-year males	5.4	5.3	5.5	5.0	4.9	4.9	5.2	5.2
Four-year females	5.2	5.1	5.0	4.9	5.1	4.8	4.9	5.0
Five-year males	7.3	7.3	7.6	6.6	6.7	6.3	6.9	7.0
Five-year females	6.8	6.6	6.7	6.2	6.7	5.9	6.0	6.5

Table XIX.—Four-year Rivers Inlet Sockeyes, 1921, showing Length Frequency Distribution on a Number of Dates.

Inches.	Males.													
	June 28.	June 30.	July 2.	July 5.	July 7.	July 12.	July 16.	July 18.	July 19.	July 27.	July 29.	Aug. 1.	Aug. 4.	Total.
19	..	..	..	..	..	..	..	..	..	..	..	..	..	..
19½	..	..	..	..	..	..	..	..	1	..	..	..	..	1
20	..	..	..	..	..	..	..	..	1	..	..	..	..	1
20½	1	1	1	..	..	..	..	..	1	..	..	..	..	4
21	2	..	..	..	2	..	1	..	..	..	..	..	..	5
21½	2	2	3	..	2	1	2	..	2	..	..	..	3	17
22	4	5	2	6	6	3	5	3	4	..	6	2	2	48
22½	1	6	5	8	4	8	4	4	4	2	3	5	2	56
23	5	3	3	10	5	1	6	5	7	3	8	4	7	67
23½	..	4	2	3	5	6	4	4	9	9	1	2	2	51
24	..	3	3	1	2	6	3	2	4	2	1	1	1	29
24½	..	2	1	..	..	..	4	1	1	3	2	..	..	14
25	..	1	..	..	..	1	1	2	..	..	..	..	..	5
25½	..	..	..	..	..	..	..	..	..	1	..	..	..	1
Totals	15	27	20	28	26	26	30	21	34	20	21	14	17	299

Inches.	Females.													
	June 28.	June 30.	July 2.	July 5.	July 7.	July 12.	July 16.	July 18.	July 19.	July 27.	July 29.	Aug. 1.	Aug. 4.	Total.
19	..	..	..	..	..	..	..	..	..	..	..	..	..	..
19½	..	..	..	..	..	..	..	..	..	..	..	..	..	..
20	..	..	..	..	..	..	..	..	..	..	..	..	..	..
20½	..	..	..	..	..	..	..	..	..	..	1	..	..	1
21	..	..	..	..	..	1	..	..	..	..	2	..	1	4
21½	..	..	1	1	1	2	2	2	2	2	..	1	2	16
22	..	2	..	1	4	1	3	2	2	3	2	2	3	25
22½	..	1	1	2	5	5	4	4	4	3	9	4	6	48
23	1	1	2	2	2	2	1	2	2	11	6	7	12	51
23½	..	1	..	1	1	1	..	1	1	7	1	4	2	20
24	1	1	1	..	..	1	..	..	..	1	..	3	3	11
24½	..	..	..	1	..	..	..	..	..	..	..	..	..	1
25	..	..	..	..	..	..	..	..	..	..	..	..	..	..
25½	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Totals	2	6	5	8	13	13	10	11	11	27	21	21	29	177

Table XX.—Five-year Rivers Inlet Sockeyes, 1921, showing Length Frequency Distribution on a Number of Dates.

Inches.	Males.													
	June 28.	June 30.	July 2.	July 5.	July 7.	July 12.	July 16.	July 18.	July 19.	July 27.	July 29.	Aug. 1.	Aug. 4.	Total.
21	..	1	..	..	..	..	..	..	..	..	..	..	..	1
21½	..	..	..	..	..	..	1	..	..	..	..	..	..	1
22	..	1	..	..	..	..	..	..	..	..	1	..	..	2
22½	..	..	..	2	2	..	1	1	2	..	..	..	..	8
23	..	1	..	3	1	1	1	..	..	..	3	2	..	12
23½	..	1	1	3	3	1	1	..	..	2	2	1	2	17
24	2	..	4	1	..	3	1	1	2	1	..	1	1	17
24½	3	..	1	..	1	..	2	2	1	1	1	..	1	13
25	..	7	3	..	..	2	2	..	..	..	1	..	..	15
25½	1	6	5	2	2	2	1	2	1	..	..	3	..	25
26	9	1	3	1	1	1	4	1	1	..	1	..	1	24
26½	10	2	3	2	3	3	..	3	1	..	..	1	..	28
27	3	5	4	..	1	..	3	3	1	..	..	..	1	21
27½	4	1	..	..	..	..	1	..	1	..	..	..	..	7
28	..	..	1	..	..	..	..	..	..	..	..	..	..	1
28½	..	..	..	..	..	..	..	..	..	..	..	..	..	..
29	..	..	..	..	1	..	..	..	..	..	..	1	..	2
Totals	32	25	26	14	15	13	18	13	10	4	9	9	6	194

Inches.	Females.													
	June 28.	June 30.	July 2.	July 5.	July 7.	July 12.	July 16.	July 18.	July 19.	July 27.	July 29.	Aug. 1.	Aug. 4.	Total.
21	..	..	..	..	..	..	..	..	..	..	..	..	..	..
21½	..	..	1	..	..	..	..	..	..	..	..	..	1	2
22	..	..	..	..	..	..	1	..	..	..	..	1	..	2
22½	..	2	3	2	1	..	..	3	..	3	2	3	4	23
23	..	1	..	2	2	1	3	4	2	3	5	2	3	28
23½	2	2	3	4	7	3	2	1	2	2	6	2	4	40
24	6	3	2	6	3	5	4	9	6	10	4	9	6	73
24½	2	4	3	4	5	4	4	3	3	3	3	2	1	41
25	5	2	3	3	1	7	1	5	4	1	3	8	1	44
25½	3	..	4	..	..	2	1	1	1	..	..	2	1	15
26	2	2	2	..	1	1	1	2	1	..	..	1	1	14
26½	4	1	1	2	..	..	..	2	..	..	..	1	..	11
27	..	..	1	..	1	..	..	..	..	..	1	..	..	3
27½	..	..	..	..	..	..	..	..	1	..	..	..	..	1
28	..	..	..	..	..	..	..	..	..	..	..	..	..	..
28½	..	..	..	..	..	..	..	..	..	..	..	..	..	..
29	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Totals	24	17	23	23	21	23	17	30	20	22	24	31	22	297

Table XXI.—Four-year Rivers Inlet Sockeyes, 1921, Weight Frequency Distribution on a Number of Dates.

Pounds.	Males.													
	June 28.	June 30.	July 2.	July 5.	July 7.	July 12.	July 16.	July 18.	July 19.	July 27.	July 29.	Aug. 1.	Aug. 4.	Total.
3	..	..	..	..	..	..	..	..	3	..	..	..	..	3
3½	1	1	..	..	..	..	..	..	..	..	..	..	..	2
4	6	..	1	..	1	..	1	..	1	..	3	..	2	15
4½	3	7	5	1	6	5	6	5	4	1	9	3	6	61
5	2	6	9	11	7	9	10	7	9	7	4	9	5	95
5½	3	7	2	9	6	6	6	6	9	6	3	2	3	68
6	..	4	1	4	3	3	3	2	8	4	2	..	..	34
6½	..	2	2	3	3	1	3	1	..	1	..	..	1	17
7	..	..	..	..	..	2	1	..	..	1	..	..	..	4
Totals	15	27	20	28	26	26	30	21	34	20	21	14	17	299

Pounds.	Females.													
	June 28.	June 30.	July 2.	July 5.	July 7.	July 12.	July 16.	July 18.	July 19.	July 27.	July 29.	Aug. 1.	Aug. 4.	Total.
3	..	..	..	..	..	..	..	..	..	..	..	..	..	..
3½	..	..	..	..	..	..	..	..	..	..	1	..	..	1
4	..	..	..	..	..	..	1	1	1	1	4	..	4	12
4½	..	1	1	1	4	7	5	8	6	6	8	5	9	61
5	1	5	2	3	6	3	2	2	1	13	8	10	8	64
5½	..	..	2	1	2	3	2	..	3	5	..	3	7	28
6	..	..	..	3	1	..	..	..	..	2	..	3	1	10
6½	1	..	..	..	..	..	..	..	..	..	..	..	..	1
7	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Totals	2	6	5	8	13	13	10	11	11	27	21	21	29	177

Table XXII.—Five-year Rivers Inlet Sockeyes, 1921, Weight Frequency Distribution on a Number of Dates.

Pounds.	Males.													
	June 28.	June 30.	July 2.	July 5.	July 7.	July 12.	July 16.	July 18.	July 19.	July 27.	July 29.	Aug. 1.	Aug. 4.	Total.
3	..	..	..	..	..	..	..	..	..	..	..	..	..	..
3½	..	..	..	..	..	..	..	..	..	..	..	..	..	..
4	..	..	..	..	..	..	..	..	..	..	..	..	..	..
4½	..	1	..	..	..	..	1	..	..	..	1	..	..	3
5	..	2	1	3	1	..	2	..	2	..	3	2	..	16
5½	2	1	3	..	3	2	2	2	1	2	3	2	1	24
6	2	1	3	5	3	3	3	2	1	2	..	..	1	26
6½	..	6	2	2	..	1	1	..	..	..	..	..	2	14
7	2	5	3	1	..	2	3	1	1	..	2	4	..	24
7½	10	3	8	..	2	4	..	5	..	..	..	..	1	33
8	6	3	2	2	1	1	3	1	2	..	..	..	1	22
8½	8	1	1	..	1	..	2	2	2	..	..	..	..	17
9	2	2	2	1	2	..	1	..	..	..	..	..	..	10
9½	..	..	1	..	1	..	..	..	1	..	..	1	..	4
10	..	..	..	..	1	..	..	..	..	..	..	..	..	1
Totals	32	25	26	14	15	13	18	13	10	4	9	9	6	194

Table XXII.—Five-year Rivers Inlet Sockeyes, 1921, Weight Frequency Distribution on a Number of Dates—Continued.

Pounds.	Females.													
	June 28.	June 30.	July 2.	July 5.	July 7.	July 12.	July 16.	July 18.	July 19.	July 27.	July 29.	Aug. 1.	Aug. 4.	Total.
3	..	..	..	..	..	..	..	..	..	..	..	..	..	..
3½	..	..	..	..	..	..	2	..	..	..	..	..	..	2
4	..	..	..	..	..	..	..	..	..	..	..	..	1	1
4½	..	..	1	..	..	..	..	3	..	2	1	3	5	15
5	1	3	3	2	2	1	2	4	2	7	11	5	2	45
5½	3	3	3	5	4	4	5	6	5	7	5	8	10	68
6	6	5	5	6	7	8	4	6	6	5	3	5	1	67
6½	5	2	2	5	4	8	2	6	2	1	2	6	2	47
7	3	2	3	3	2	2	2	1	3	..	1	3	1	26
7½	4	1	4	1	1	..	..	4	1	..	1	1	..	18
8	2	1	1	..	..	..	..	..	1	..	..	..	..	5
8½	..	..	1	1	1	..	..	..	..	..	..	..	..	3
9	..	..	..	..	..	..	..	..	..	..	..	..	..	..
9½	..	..	..	..	..	..	..	..	..	..	..	..	..	..
10	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Totals	24	17	23	23	21	23	17	30	20	22	24	31	22	297

Table XXIII.—Average Lengths in Inches of Rivers Inlet Sockeyes, Run of 1921, on a Number of Dates.

	June 28.	June 30.	July 2.	July 5.	July 7.	July 12.	July 16.	July 18.	July 19.	July 27.	July 29.	Aug. 1.	Aug. 4.
Four-year males ..	22.1	22.9	22.7	22.7	22.6	23.1	23.0	23.2	22.8	23.6	22.9	22.8	22.7
Four-year females .	23.5	22.8	22.8	22.8	22.4	22.5	22.2	22.6	22.4	22.9	22.8	23.0	22.8
Five-year males ..	26.1	25.5	25.5	24.2	24.8	25.0	25.0	25.6	25.0	23.9	23.7	24.8	24.5
Five-year females .	25.0	24.3	24.5	24.1	24.1	24.7	23.1	24.3	24.5	23.7	23.9	24.3	23.2

From the above table it appears that, with the possible exception of the four-year males, none of the year-groups increased in average length during the season. For the first six dates given the four-year males averaged 22.7 inches and for the last six dates 23 inches. The four-year males differ from the other three year-groups in the diminutive size of the first fish to appear on June 28th. In all other groups the first fish to appear were of larger average size than on any subsequent date during the season, while the reverse was the case with the four-year males. The smallest males entered first. The four-year females maintained their average size unchanged throughout the season. The first six dates give us an average of 22.8 inches and the last six dates 22.75 inches. The point that here deserves our attention is the longer feeding and growing period of those which entered late. The females that averaged 22.8 inches on August 4th had been feeding and growing five weeks longer than those which also averaged 22.8 inches on June 30th. The conclusion is inevitable that the first fish to enter the river were the largest of the schools (with the exception of the four-year males), and the others successively abandoned their sea-feeding grounds and turned streamwards, when they had attained the same stature as those earliest to run.

This tendency for the Rivers Inlet sockeyes of the 1921 run to inaugurate the run with the largest individuals is even better shown in the five-year fish. In these, notwithstanding their continued growth, the later individuals were smaller than those of the early half of the run. They had not been able to overtake them, in spite of their additional weeks of growth. For the first six dates of the above table the five-year males averaged 25.2 inches and for the last six dates 24.6 inches, and the corresponding averages for the five-year females are 24.5 and 24.0

inches. Five-year sockeyes, as is well known, grow far less rapidly during their last season than do four-year fish. The smaller individuals among the five-year group would be less likely, therefore, to make good their deficiency by an additional period of feeding in the sea.

It is not known whether the tendency here observed is followed generally in all years by the Rivers Inlet race. Still less do we know of its existence in other races. Often the later portion of the run in certain rivers is characterized by somewhat larger fish. But they may have been smaller during the first days of the season, when the early run left them behind to continue their feeding. In such cases, also, the larger individuals of the school may successively have been drafted to maintain the spawning run.

The procedure here in the conduct of the spawning migration is very similar to what we have observed in the seaward migration of the yearlings in the early spring. In the third paper of this series (Report of the Commissioner of Fisheries for the year ending December 31st, 1915, page 45) we reported on the size of yearling migrants obtained in the Owikeno River. An extensive series of the year 1914 agreed perfectly with a second series collected the following year, in showing a constantly diminishing size as the season progressed. In this case, also, the larger individuals successively abandoned the school and those that remained behind in the lake continued to feed voraciously and to grow. While the causes that determine this procedure are unknown, the parallelism is striking between the seaward migration of the diminutive fingerlings and the streamward migration of the mature salmon.

THE SKEENA RIVER SOCKEYE RUN OF 1920.

(1.) The Year-groups.

The Skeena River run of 1920 agreed with that of Rivers Inlet in being derived in part from a good brood-year and in part from a very poor brood-year. The five-year fish of 1920 belonged to the brood of 1915, which produced a pack of 116,553 cases; while the four-year component of the 1920 run was derived from the brood of 1916, which produced a pack of only 60,923 cases. These conditions were clearly reflected in the character of the run, which was well below the average in size (90,869 cases) and was largely composed of five-year fish. The year 1916 contributed very little to its success.

As is shown by the following table, different years in the Skeena basin vary in the relative size of the four- and five-year classes, but almost always the older group predominates. Like the Rivers Inlet and Nass River colonies, the Skeena is dependent more on its five- than its four-year members, and thus approximates a five-year cycle. The average percentage of this group for the eight years from 1912 to 1919 is 60 per cent. and the highest attained in any year was 75 per cent. But in 1920 the five-year group comprised 82 per cent. of the one-year-in-lake type. The extremely large representation in 1920 was undoubtedly due to the favourable brood-year for the five-year fish, in conjunction with the very unfavourable brood-year for the four-year fish. As appears elsewhere in this report, an entirely similar condition produced in the 1920 run in Rivers Inlet a still larger representation of the five-year group, which comprised 95 per cent. of the run.

Table XXIV.—Percentages of Four- and Five-year Skeena Sockeyes that spent One Year in Lake in Runs of Successive Years.

Run of the Year.	Percentage Four and Five Years old.	Brood-year from which derived.
1912 (92,498 cases)	5 yrs. 43%	1907 (108,413 cases).
	4 yrs. 57%	1908 (139,846 cases).
1913 (52,927 cases)	5 yrs. 50%	
	4 yrs. 50%	1909 (87,901 cases).
1914 (130,166 cases)	5 yrs. 75%	
	4 yrs. 25%	1910 (187,246 cases).
1915 (116,553 cases)	5 yrs. 64%	
	4 yrs. 36%	1911 (131,066 cases)
1916 (60,923 cases)	5 yrs. 60%	
	4 yrs. 40%	1912 (92,498 cases).
1917 (65,760 cases)	5 yrs. 62%	
	4 yrs. 38%	1913 (52,927 cases).
1918 (123,322 cases)	5 yrs. 59%	
	4 yrs. 41%	1914 (130,166 cases).
1919 (184,945 cases)	5 yrs. 69%	
	4 yrs. 31%	1915 (116,553 cases).
1920 (90,869 cases)	5 yrs. 82%	
	4 yrs. 18%	1916 (60,923 cases).

The relative size of the various age-groups that constitute the run varies not only from year to year, but in different portions of the same run. This is shown for the year 1920 by the following table, which gives the percentages in which the four year-classes occur in the run on a series of dates. A similar table in our report for the year 1919 (1920), page 60, shows a definite and progressive change in the relative dimensions of the two principal classes, which belong to the one-year-in-lake type. In 1919 the four-year class was poorly represented at first, but increased steadily in numbers throughout the season, while the opposite tendency was clearly shown in the five-year class. But in 1920 no tendency is as clearly defined and such changes as occur are rather in the opposite direction. The four-year class is relatively smaller in the latter half of the run.

Table XXV.—Percentages of Different Age-groups, Skeena River Sockeyes, on a Succession of Dates, Season of 1920.

Dates, 1920.	Number of Specimens.	One Year in Lake.		Two Years in Lake.	
		Four Years old.	Five Years old.	Five Years old.	Six Years old.
July 5	75	16	68	8	8
„ 7	49	20	74	4	2
„ 9	124	16	66	11	7
„ 12	117	18	73	6	3
„ 16	125	18	68	6	8
„ 19	124	15	73	6	6
„ 20	122	18	73	5	4
„ 26	124	9	74	3	14
„ 28	123	18	63	8	11
Aug. 2	118	19	72	3	6
„ 5	171	8	77	6	9
„ 10	71	7	75	8	10
„ 12	120	8	79	3	10
„ 18	104	16	55	11	18
Totals	1,537	15	71	6	8

Table XXVI.—Percentages of Different Age-groups, Skeena River Sockeyes, from 1916 to 1920.

Year.	One Year in Lake.		Two Years in Lake.	
	Four Years old.	Five Years old.	Five Years old.	Six Years old.
1916	34	38	13	15
1917	57	29	9	5
1918	51	34	9	6
1919	27	60	9	4
1920	15	71	6	8
Averages	37	46	9	8

The size attained by the different age-classes is determined principally by the number of years spent in the sea, and the age when they become mature is similarly determined. Two of the four age-classes in the Skeena have spent three seasons in the sea; the other two have spent four seasons. To the former group belong the four-year fish and the five-year class that spent two years in fresh water before entering the sea. The group that spent four seasons feeding in the sea is composed of the five-year class that remained one year in the lake and the six-year class that remained two years in the lake. If we consider the relative abundance of the two groups thus defined at different periods of the run in 1920 we have the results shown in the following table. The fish that had lived longest in the sea, and were maturing one year later than the other group, ran more heavily in the later part of the season.

Table XXVII.—Percentages, 1920.

Date.	Three Years' Sea-feeding.	Four Years' Sea-feeding.
July 5, 7, 9	28.7	71.3
„ 12, 16, 19	22.8	77.2
„ 20, 26, 28	20.0	80.0
Aug. 2, 5, 10	17.0	83.0
„ 12, 18	18.0	82.0

(2.) LENGTHS.

The material at hand for study of the 1920 run consists of random samples taken at close intervals in time throughout the run. Fourteen dates are represented, distributed through July and the first half of August, the total number of individuals examined being 1,567. The lengths were obtained, as usual for these studies, with a steel tape, and were measured over the curve of the sides of the fish from the median line of the snout to the outer tip of the middle rays of the caudal fin. The middle rays are the shortest and their tips lie at the beginning of the notch of the tail-fin.

We give below an analysis of the run, based on the samples submitted. The number of individuals of each age-class appear, grouped by sex and by length, and the average size is given of each category.

Table XXVIII.—Skeena River Sockeyes, 1920, grouped by Age, Sex, and Length.

Length in Inches.	Number of Individuals.							
	One-year-in-lake Type.				Two-years-in-lake Type.			
	Four-Years old.		Five Years old.		Five Years old.		Six Years old.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
19	..	..	..	..	..	..	..	..
19½	..	1	..	..	..	..	..	..
20	..	..	..	..	..	..	..	..
20½	..	..	..	..	..	..	..	..
21	..	1	..	..	..	..	..	..
21½	..	3	..	..	..	..	..	..
22	3	14	..	2	..	2	..	1
22½	7	24	1	3	1	8	..	..
23	13	18	1	4	5	8	1	2
23½	23	31	3	26	4	18	..	6
24	17	22	7	47	13	12	1	10
24½	16	14	31	115	13	6	4	11
25	7	3	31	141	3	1	6	13
25½	5	..	72	143	3	..	10	16
26	2	..	66	125	..	..	6	9
26½	..	..	93	52	..	..	4	6
27	..	1	41	26	..	..	8	3
27½	..	..	41	11	..	..	9	3
28	..	..	16	2	..	..	6	..
28½	..	..	9	..	..	..	..	..
29	..	..	1	..	..	..	..	..
Totals	93	132	413	697	42	55	55	80
Average lengths	23.8	23.2	26.2	25.3	24.1	23.4	26.2	25.1

A comparison of the average lengths in 1920 of males and females of the different year-classes with those of former years is given in the two tables which follow. The figures for 1920 stand very close to the averages of several years. The younger age-class in each table is slightly smaller than the average for a number of years, and the older age-class in each table is larger than the general average, in both males and females.

From an inspection of the general averages given in the last columns of these tables it again becomes apparent that the two-years-in-lake type obtain no advantage in size from their extra year of life. The five-year class of this type has spent the same time feeding at sea as the four-year class of the one-year-in-lake type. As seen from the tables, there is no significant differences in their size. The same is true of the six-year fish of the lower table compared with the five-year group above. The extra year brings no advantage and exposes them to attack for an entire year in which they are especially vulnerable.

Table XXIX.—Average Lengths of Skeena River Sockeyes, One Year in Lake, for Nine Successive Years.

	1912.	1913.	1914.	1915.	1916.	1917.	1918.	1919.	1920.	Average.
Four-year males	24.6	23.5	24.2	24.2	23.9	23.6	24.1	24.3	23.8	24.0
Four-year females	23.5	22.9	23.4	23.5	23.6	23.2	23.3	23.4	23.2	23.3
Five-year males	26.4	25.5	26.2	25.9	26.2	25.5	25.9	25.7	26.2	25.9
Five-year females	25.2	24.7	25.1	25.0	25.0	24.7	25.0	24.8	25.3	25.0

Table XXX.—Average Lengths of Skeena River Sockeyes, Two Years in Lake, for Five Successive Years.

	1916.	1917.	1918.	1919.	1920.	Average.
Five-year males	24.1	23.9	23.9	24.3	24.0	24.1
Five-year females	23.8	23.8	23.4	23.4	23.4	23.6
Six-year males	26.2	25.4	25.2	25.8	26.2	25.8
Six-year females	24.8	25.0	24.7	24.7	25.1	24.9

The weight distribution among the four year-classes is given in the following table, the males and females in each class being given separately. On the lower two lines of the table are given the average lengths for each year-class, and for comparison the general averages for a term of years. The latter can be used as a basis for judging the standing of the year with respect to size. As we found in our discussion of lengths, so here it appears that the two younger classes in each of the types are slightly smaller than the general averages, while the two older classes of each type are well above the average.

Table XXXI.—Skeena River Sockeyes, 1920, grouped by Weight, Age, Sex, and by their Early History.

Weight in Pounds.	One Year in Lake.				Two Years in Lake.			
	Four Years old.		Five Years old.		Five Years old.		Six Years old.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
3	..	..	..	..	..	..	..	..
3½	..	..	..	..	..	..	..	..
4	..	7	..	..	..	1	..	..
4½	10	44	1	5	2	15	..	1
5	24	34	8	26	4	17	1	4
5½	22	24	20	112	11	14	6	17
6	22	18	49	135	15	5	3	19
6½	12	4	61	204	5	3	8	13
7	2	..	83	104	4	..	6	8
7½	1	1	78	73	1	..	11	16
8	..	..	60	28	..	..	7	2
8½	..	..	34	9	..	..	10	..
9	..	..	12	1	..	..	3	..
9½	..	..	6	..	..	..	..	..
10	..	..	1	..	..	..	..	..
10½	..	..	..	..	..	..	..	..
No. of specimens...	93	132	413	697	42	55	55	80
Average weights ..	5.6	5.1	7.2	6.4	6.3	5.1	7.3	6.3
Averages, 1915–20..	5.7	5.2	6.9	6.3	5.9	5.3	6.8	6.1

In the two groups most numerously represented in the Skeena River—the four- and five-year classes, that spent their first year in lake residence—an increase in length as the season progresses is clearly evident. This appears below in the average lengths for a series of dates in 1920:—

Date.	Four Years old.		Five Years old.	
	Males.	Females.	Males.	Females.
July 5, 7, 9	23.3	22.9	25.4	24.9
„ 12, 16, 19	23.6	23.2	26.0	25.2
„ 20, 26, 28	24.3	23.1	26.4	25.4
Aug. 2, 5, 10	23.9	23.4	26.4	25.3
„ 12, 18	24.3	23.4	26.3	25.2

(3.) Males and Females.

The season of 1920 was exceptional in presenting a higher percentage of females than of males in every age-class. During the eight previous years of which we have a record the males of the four-year class have been more numerous than the females, the females have outnumbered the males in the five-year class with one lake-year, the males have again been most abundant in the five-year class of the two lake-year type, and also in the six-year class, prior to 1919.

In all river-basins thus far examined, in which the five-year classes predominate, the four-year males are in excess of the five-year females. But in the Fraser River, in which the four-year class prevails, this group has the sexes equally represented.

The history of the Skeena River as regards the relative numbers of the sexes is shown in the following table:—

Table XXXII.—Relative Numbers of Males and Females in Different Year-groups, Skeena River Sockeyes, in a Series of Years.

Year.	One Year in Lake.				Two Years in Lake.			
	Four Years old.		Five Years old.		Five Years old.		Six Years old.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
1912	54	46	42	58	..	..	..	..
1913	69	31	47	53	..	..	..	..
1914	60	40	47	53	..	..	..	..
1915	55	45	45	55	..	..	..	..
1916	70	30	43	57	56	44	54	46
1917	65	35	48	52	65	35	58	42
1918	63	37	46	54	61	39	56	44
1919	53	47	46	54	52	48	45	55
1920	41	59	37	63	43	57	41	59
Averages	59	41	44	56	55	45	51	49

THE SKEENA RIVER SOCKEYE RUN OF 1921.

(1.) General Characteristics.

The salient features of the run of 1921 are best brought out by a comparison with the run of 1920. The latter was produced by one good brood-year (1915) and one poor one (1916). The result was a run of medium size, over four-fifths of which were progeny of the good brood-year. The run of 1921 had as antecedents two extremely poor brood-years, the worst, with a single exception, that had hitherto occurred in the Skeena River. The result of this portentous combination was, in 1921, a still lower level of production than the Skeena had previously attained. The pack of only 41,000 cases in 1921 registered a further decline of 35 per cent., compared with the extremely meagre yields of the two brood-years that produced it.

If the salmon runs were enemy forces that we were desirous of annihilating, no more certain method could be devised than destroying them thus in detail. The detachments appearing each year operate wholly independently of those that immediately precede and follow. If we succeed in destroying only one or two annual detachments in a five-year cycle, the results become cumulative and the eventual destruction of the run is assured.

It cannot too often be urged that a rational policy of conservation must prescribe a large annual safety factor. We must continue each year to provide for the escape of larger numbers of spawning fish than are necessary to ensure adequate production during seasons in which the conditions are favourable. A rationally controlled stream will show its spawning-grounds each year seemingly overpopulated. This is nature's method of preventing serious depletion during the not infrequent years when conditions are unfavourable for successful propagation and growth, and there is no other safe method. Failure to observe this obvious precaution must be held responsible in no small measure for the certain depletion with which all our salmon-streams are threatened.

The appearance of occasional good years in the course of a declining run is customary and to be expected. They should not serve in any degree to allay our apprehensions. Poor years also, it is true, have occurred during the most prosperous periods of productivity in our streams. But in a declining salmon run the poor years become ever more numerous, they infallibly in the long run produce their kind, and they fall to lower and lower levels. The average production for a series of years can always be depended on to tell the tale.

With these facts in mind, no one can doubt the serious condition we are fast realizing on the Skeena and, it may be just to remark, on all the great salmon-rivers of the Province.

The measures adopted in 1908 for the preservation of the salmon-fisheries of the Province were of much promise. By preventing the incursion of new canneries in districts already fully developed, and by limiting the amount and character of gear that should be used in each fishing district, a measure of control was assumed which would, if adequately administered, ensure the preservation of the salmon runs. This method is incontestably the best that has been devised for the purpose. Opposed to it stands the alternative method of unrestricted competition, the results of which are now so alarmingly manifest in the waters of Alaska.

But restriction in number of canneries and in amount of fishing-gear obviously will not suffice to protect a stream unless the restrictions are adequate in amount. It is impossible to know in advance the utmost extent of the drafts that can safely be made on the run of any stream. Cannery restriction and a definite boat-rating must always be considered tentative measures. The situation is one that calls for solicitous inspection and constant watchfulness. Regulations should be subject to annual revision on the part of responsible officials closely in touch with conditions as they develop.

(2.) THE AGE-CLASSES.

We have made our customary analysis of the run of 1921 and present the results in a series of tables given below.

As regards their early history, the Skeena sockeyes fall in two main groups, the one-year-in-lake and the two-years-in-lake groups; those of the former group descending to salt water after one year's residence as fingerlings in their native lake, the members of the second group spending an additional year in fresh water.

In the Skeena basin always the one-year-in-lake group is the most important, and contains two year-classes, which are maturing at the ages respectively of four and of five years. The less important group, with two lake-years in their early history, also contains two year-classes, which are respectively in their fifth and their sixth years. The relative numbers in these four year-classes, with their length and weight distributions, appear in the two tables which follow.

Table XXXIII.—Skeena River Sockeyes, 1921, grouped by Length, Age, Sex, and by their Early History.

Length in Inches.	Number of Individuals that spent							
	One Year in Lake.				Two Years in Lake.			
	Four Years old.		Five Years old.		Five Years old.		Six Years old.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
19	..	..	..	..	..	1	..	..
19½	..	..	..	..	..	..	..	..
20	..	..	..	..	..	..	..	..
20½	1	..	..	..	..	..	..	..
21	1	10	..	..	..	..	..	..
21½	9	20	..	1	..	3	..	..
22	16	59	..	4	..	..	..	..
22½	42	158	2	7	2	14	1	3
23	66	152	6	15	5	11	2	3
23½	125	189	11	56	16	10	1	4
24	113	91	19	49	10	10	2	4
24½	124	52	33	37	12	7	4	8
25	60	9	28	42	8	2	6	4
25½	27	3	38	15	4	..	3	3
26	6	1	20	7	..	1	..	..
26½	1	1	19	7	1	..	2	..
27	1	..	10	1	..	..	2	..
27½	..	..	6	..	1	..	..	1
28	..	..	..	..	..	..	..	..
28½	..	..	..	..	..	..	..	..
29	..	..	..	..	..	..	..	..
Totals	592	745	192	241	59	59	23	30
Average lengths	23.8	23.1	25.2	24.2	24.2	23.4	24.9	24.2

Table XXXIV.—Skeena River Sockeyes, 1921, grouped by Weight, Age, Sex, and by their Early History.

Weight in Pounds.	Number of Individuals that spent							
	One Year in Lake.				Two Years in Lake.			
	Four Years old.		Five Years old.		Five Years old.		Six Years old.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
2	..	..	..	..	..	..	..	..
2½	..	..	..	..	..	1	..	..
3	1	..	..	..	..	..	..	..
3½	..	2	..	..	..	..	..	..
4	9	23	..	3	..	1	..	..
4½	59	179	4	15	5	16	1	6
5	90	246	10	48	12	17	4	5
5½	162	185	34	71	14	10	3	6
6	142	78	37	52	10	12	6	3
6½	83	28	44	31	10	2	5	8
7	29	3	24	11	4	..	1	1
7½	13	..	23	7	2	..	3	..
8	4	1	10	2	1	..	..	1
8½	..	..	5	1	..	..	..	..
9	..	..	..	..	1	..	..	..
9½	..	..	1	..	..	..	..	..
10	..	..	..	..	..	..	..	..
Totals	592	745	192	241	59	59	23	30
Average weights	5.7	5.1	6.4	5.7	5.8	5.1	6.0	5.7

As is seen by the preceding tables, the one-year-in-lake group far exceeds the other and constitutes so large a percentage of the run that our statistics of the Skeena run have often concerned themselves for practical reasons exclusively with this group. In 1921 it comprised 91 per cent. of all the salmon that entered the Skeena, a figure somewhat, though not greatly, in excess of the average for a term of years. We give below for comparison the relative proportions of the four year-classes in the Skeena runs from 1916 to 1921. If we exclude the year 1916, which was very unusual in extreme development of two-years-in-lake sockeyes, we find the other five years show a remarkable agreement in the relative size of the two main divisions. The average for the five years is 87 per cent. one-year-in-lake type and 13 per cent. two-years-in-lake type.

Table XXXV.—Percentages of Different Age-groups, Skeena River Sockeyes, from 1916 to 1921.

Year.	One Year in Lake.		Two Years in Lake.	
	Four Years old.	Five Years old.	Five Years old.	Six Years old.
1916	34	38	13	18
1917	57	29	9	5
1918	51	34	9	6
1919	27	60	9	4
1920	15	71	6	8
1921	69	22	6	3
Averages, 1916 to 1920	37	46	9	8

The two tables which follow treat the two general groups and the four age-classes as these were found to occur in different periods throughout the entire run. The material collected by the Department of Fisheries consisted of eighteen samples taken on different dates, usually three or four days apart, consisting in all of 1,941 sockeyes. No very obvious changes in the constitution of the run with respect to its year-classes are indicated by these tables.

Table XXXVI.—Percentages of Different Age-classes, Skeena River Sockeyes, found to constitute the Run on a Succession of Dates, Season of 1921.

Dates, 1921.	One Year in Lake.		Two Years in Lake.		Number of Specimens.
	Four Years old.	Five Years old.	Five Years old.	Six Years old.	
June 21	71	21	7	1	125
„ 24	68	20	7	5	121
„ 27	71	19	4	6	123
„ 30	61	30	7	2	122
July 5	61	26	8	5	122
„ 8	68	16	13	3	115
„ 12	70	20	8	2	124
„ 14	74	19	4	3	124
„ 18	68	22	9	1	120
„ 21	80	18	1	1	120
„ 25	72	19	8	1	118
„ 28	68	30	1	1	106
Aug. 2	66	20	6	8	105
„ 5	75	22	3	..	102
„ 9	83	12	4	1	78
„ 11	68	24	5	3	75
„ 15	53	37	6	4	71
„ 18	53	33	7	7	70
Averages	69	22	6	3	1,941

Table XXXVII.—Relative Numbers in One-year-in-lake and Two-years-in-lake Groups, Skeena River Sockeyes, 1921, on a Succession of Dates.

Dates, 1921.	One Year in Lake.	Two Years in Lake.
June 21	92	8
„ 24	88	12
„ 27	90	10
„ 30	91	9
July 5	87	13
„ 8	84	16
„ 12	90	10
„ 14	94	6
„ 18	90	10
„ 21	98	2
„ 25	92	8
„ 28	98	2
Aug. 2	87	13
„ 5	97	3
„ 9	95	5
„ 11	92	8
„ 15	90	10
„ 18	86	14
Averages	91	9

If the classes be grouped according to the number of years spent feeding in the sea, where practically all of their growth occurs, we find that the two younger classes of each group have had three years' feeding at sea and the two older classes of each group have had four years. On a series of dates extending throughout the run we find a uniform progression in the relative sizes of these two assemblages, as shown in the following table. The extent of the change is not great, but the uniform trend is obvious, and its significance is attested by a similar progression of much greater amount which appeared in the run of 1919, and is made evident in Table 40 of our report for that year. In 1919 the assemblage which had spent three years in the sea increased from 27 per cent. at the beginning of the season to 51 per cent. at its close. The change was therefore in the same direction as in 1921, the older group running most heavily in the early part of the season.

Table XXXVIII.—Percentages of Skeena River Sockeyes, 1921, with Three and Four Years' Feeding at Sea.

Date.	Three Years' Sea-feeding.	Four Years' Sea-feeding.
June 21, 24, 27, 30	74	26
July 5, 8, 12, 14	77	23
„ 18, 21, 25, 28	77	23
Aug. 2, 5, 9	79	21
„ 11, 15, 18	64	28

A most striking contrast is presented by the runs of 1920 and 1921 in the relative numbers which they contained of the two principal year-classes, the four- and the five-year classes of the one-year-in-lake group. In 1920, as has been pointed out in the report of the run of that year, the five-year class was far in excess and constituted 82 per cent. of the group. In 1921 the relations were almost completely reversed, with the four-year class comprising 76 per cent. of the group. In 1920 the disparity in numbers of the two age-classes seems to receive ready explanation in the relative sizes of their respective brood-years. 1915 could well be expected to produce a larger number of progeny than 1916. But the case is not so clear in the run of 1921. Both four- and five-year fish of 1921 had very poor brood-years, to all appearances about equally

poor. We can only assume that the run of 1916 encountered even harder conditions than its almost equally poor sister. The relations of brood-years to their progeny are shown below for a term of years.

Table XXXIX.—Percentages of Four- and Five-year Skeena River Sockeyes that spent One Year in Lake, in Runs of Successive Years.

Run of the Year.	Percentage Four and Five Years old.	Brood-years from which derived.
1912 (92,498 cases)	5 yrs. 43% 4 yrs. 57%	1907 (108,413 cases). 1908 (139,846 cases).
1913 (52,927 cases)	5 yrs. 50% 4 yrs. 50%	1908 (139,846 cases). 1909 (87,901 cases).
1914 (130,166 cases)	5 yrs. 75% 4 yrs. 25%	1909 (87,901 cases). 1910 (187,246 cases).
1915 (116,553 cases)	5 yrs. 64% 4 yrs. 36%	1910 (187,246 cases). 1911 (131,066 cases).
1916 (60,923 cases)	5 yrs. 60% 4 yrs. 40%	1911 (131,066 cases). 1912 (92,498 cases).
1917 (65,760 cases)	5 yrs. 62% 4 yrs. 38%	1912 (92,498 cases). 1913 (52,927 cases).
1918 (123,322 cases)	5 yrs. 59% 4 yrs. 41%	1913 (52,927 cases). 1914 (130,166 cases).
1919 (184,945 cases)	5 yrs. 69% 4 yrs. 31%	1914 (130,166 cases). 1915 (116,553 cases).
1920 (90,869 cases)	5 yrs. 82% 4 yrs. 18%	1915 (116,553 cases). 1916 (60,923 cases).
1921 (41,018 cases)	5 yrs. 24% 4 yrs. 76%	1916 (60,923 cases). 1917 (65,760 cases).

(3.) LENGTHS AND WEIGHTS.

The size attained by the different categories of the 1921 run to the Skeena, as evidenced by the lengths and weights of our samples, is shown in a series of tables given below.

In the first of these the average lengths of the four year-classes in 1921 are brought in comparison with the average of similar figures obtained during analyses of the runs from 1912 to 1920. These general averages undoubtedly present a reliable normal size for the age-classes of this river. On comparison, it is seen in 1921 that the two younger year-classes of each group —the four-year class of the first and the five-year class of the second—are almost up to the standard, while the older two year-classes—the five-year class of the first group and the six-year class of the second—are in each case far below the normal. The apparent significance of this diversity in growth among the different year-classes is emphasized when we come to consider the nature of the grouping. The two younger classes, which reached normal size, while not of the same age, had spent the same length of time, and in fact the same three years, in the sea. Equally the two older classes, while one was five and the other six years old, had spent the same period in the ocean—a period which included the same three years with the two younger classes, together with a fourth year which was not shared by the other two. A more intensive study of the scales than we have been able to make would demonstrate whether the abnormally restricted growth was evenly distributed among the years of sea-feeding or could be considered the result of unfavourable conditions during a shorter period of time. It is worthy of note that five- and six-year classes in the 1921 run of the Nass and Rivers Inlet—the nearest important sockeye-streams—showed no deficiency in length compared with averages in those streams.

Table XL.—Average Lengths of Skeena River Sockeyes, 1921, compared with General Averages, 1912 to 1920.

	Average Lengths, 1921.	Averages, 1912 to 1920.
One year in lake—		
Four-year males	23.8	24.0
Four-year females	23.1	23.3
Five-year males	25.2	25.9
Five-year females	24.2	25.0
Two years in lake—		
Five-year males	24.2	24.1
Five-year females	23.4	23.6
Six-year males	24.9	25.8
Six-year females	24.2	24.9

Table XLI.—Skeena River Sockeyes, 1921, One Year in Lake, Average Lengths on a Series of Dates.

Date.	Four Years old.		Five Years old.	
	Males.	Females.	Males.	Females.
June 21, 24	23.9	23.0	25.2	24.1
„ 27, 30, July 3, 8	23.7	22.9	25.4	23.9
July 12, 14, 18	23.9	23.0	25.1	24.2
„ 21, 25, 28	23.8	23.1	24.8	24.4
Aug. 2, 5	24.1	23.3	25.1	24.5
„ 9, 11	24.4	23.4	25.6	24.0
„ 15, 18	23.8	23.3	25.4	24.6

Table XLII.—Average Lengths of Skeena River Sockeyes, One Year in Lake, for Ten Successive Years.

	1912.	1913.	1914.	1915.	1916.	1917.	1918.	1919.	1920.	1921.
Four-year males	24.6	23.5	24.2	24.2	23.9	23.6	24.1	24.3	23.8	23.8
Four-year females	23.5	22.9	23.4	23.5	23.6	23.2	23.3	23.4	23.2	23.1
Five-year males	26.4	25.5	26.2	25.9	26.2	25.5	25.9	25.7	26.2	25.2
Five-year females	25.2	24.7	25.1	25.0	25.0	24.7	25.0	24.8	25.3	24.2

Table XLIII.—Average Lengths of Skeena River Sockeyes, Two Years in Lake, for Six Successive Years.

	1916.	1917.	1918.	1919.	1920.	1921.
Five-year males	24.1	23.9	23.9	24.3	24.1	24.2
Five-year females	23.8	23.8	23.4	23.4	23.4	23.4
Six-year males	26.2	25.4	25.2	25.8	26.2	24.9
Six-year females	24.8	25.0	24.7	24.7	25.1	24.2

The average weights of the different year-classes are in accord with the data presented above for the lengths. The two classes with three years' residence in the sea are of average size or only slightly below the average. This holds equally for males and females of each class.

But the two classes that remained growing in the sea for four seasons are not only below normal, but so far below that no parallel can be found among the runs of the preceding seven years for which we have records of weights.

Table XLIV.—Average Weights of Skeena River Sockeyes, 1921, compared with General Averages, 1915 to 1921.

	Average Weights, 1921.	Averages, 1915 to 1920.
One year in lake—		
Four-year males	5.7	5.7
Four-year females	5.1	5.2
Five-year males	6.4	6.9
Five-year females	5.7	6.3
Two years in lake—		
Five-year males	5.8	5.9
Five-year females	5.1	5.3
Six-year males	6.0	6.8
Six-year females	5.6	6.1

Table XLV.—Average Weights of Skeena River Sockeyes for Eight Successive Years.

	1914.	1915.	1916.	1917.	1918.	1919.	1920.	1921.
One year in lake—								
Four-year males	5.9	5.7	5.4	5.3	5.8	6.1	5.6	5.7
Four-year females	5.3	5.2	5.1	5.0	5.3	5.5	5.1	5.1
Five-year males	7.2	6.8	7.1	6.4	6.9	7.0	7.2	6.4
Five-year females	6.3	6.2	6.3	6.0	6.4	6.2	6.4	5.7
Two years in lake—								
Five-year males	..	5.9	5.8	5.5	5.7	6.1	6.3	5.8
Five-year females	..	5.2	5.4	5.2	5.3	5.4	5.1	5.1
Six-year males	..	6.6	7.1	6.3	6.6	6.9	7.3	6.0
Six-year females	..	6.0	5.9	5.8	6.1	6.3	6.3	5.6

(4.) Males and Females.

The last two years stand alone in the series which we have examined, in the excess of females in practically all groups. It is the general rule on the Skeena, as indeed in the majority of the sockeye-streams, for the four-year males to exceed in number the females. During the eight years prior to 1920 the records give an average of 59 per cent. males and only 41 per cent. females in this class, and in no year of the series did females outnumber the males. It seems remarkable, therefore, that this relation should be reversed during two years in succession.

The same condition exists to an approximately equal degree in the five-year class that spent two years in lake. The average of four years shows 55 per cent. males, but in 1920 there were but 43 per cent. males and in 1921 50 per cent.

Table XLVI.—Relative Numbers of Males and Females in Different Year-groups, Skeena River Sockeyes, in a Series of Years.

Year.	One Year in Lake.				Two Years in Lake.			
	Four Years old.		Five Years old.		Five Years old.		Six Years old.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
1912	54	46	42	58	..	..	..	..
1913	69	31	47	53	..	..	..	..
1914	60	40	47	53	..	..	..	..
1915	55	45	45	55	..	..	..	..
1916	70	30	43	57	56	44	54	46
1917	65	35	48	52	65	35	58	42
1918	63	37	46	54	61	39	56	44
1919	53	47	46	54	52	48	45	55
1920	41	59	37	63	43	57	41	59
1921	44	56	44	56	50	50	43	57
Averages, 1912–20...	59	41	44	56	55	45	51	49

THE SOCKEYE RUN TO THE NASS RIVER IN 1920.

(1.) General Considerations.

In our report on the Nass River run of sockeyes in 1919 (page 64) we called attention to certain disquieting features in the recent history of the river, and stated that extreme interest would attach to the history of the next few years, which would certainly demonstrate to what extent the river was being depleted of salmon. The first of this series goes far toward justifying any forebodings we may have entertained. The pack of 16,740 cases was nearly 25 per cent. less than the smallest previous pack of recent years. The Nass River has a five-year cycle. The average pack for the last cycle, 1916 to 1920, is 24,083 cases; and for the preceding cycle, 1911 to 1915, is 33,523 cases. Three years of the previous cycle had each a larger pack than was made by any single year of the last period, and three years of the last period had each a lower record than was made by any year during the preceding five-year cycle. The evidence now appears conclusive that the Nass River run has suffered impairment. How serious the damage has been cannot be fully ascertained until the progeny of the present cycle, now feeding in lake and sea, shall have matured and constituted the runs of the next few years. All of those interested in the perpetuation of the salmon industry on the Nass should co-operate to lessen the intensity of fishing operations in this district before hopeless depletion has become a fact. The condition has become highly critical.

(2.) THE AGE-GROUPS.

In the 1920 run there were represented seven different age-groups, four of which constituted 98 per cent. of the run. These are the four- and five-year groups, the young of which had spent one year in fresh water before passing out to sea; and the five- and six-year groups, the young of which had spent their first two years in fresh water. Of these, the two five-year groups, as usual in this river-basin, were of prime importance, together forming 84 per cent. of the whole run. Although containing such diverse elements and sockeyes of such a wide range in age—from three to seven years—the Nass may well be considered to have a five-year cycle.

The following table gives the percentages of the four principal year-groups in the Nass River run for the past nine years. Minor fluctuations occur in the relative abundance of the four groups in different years, but in general the order of precedence is clearly maintained. The most abundant group numerically is the five-year-old, two-years-in-lake class, which usually constitutes well over 50 per cent. of the run. The five-year-old, one-year-in-lake class occupies second place, producing nearly 20 per cent. of the run, usually exceeding the other two classes combined. The year 1920 closely approximated the average distribution of the year-classes, showing an excess in the predominating class and a corresponding deficiency in the one-year-in-lake groups.

Table XLVII.

Year.	PERCENTAGE OF INDIVIDUALS THAT SPENT			
	One Year in Lake.		Two Years in Lake.	
	Four Years old.	Five Years old.	Five Years old.	Six Years old.
1912	8	27	63	2
1913	15	12	71	2
1914	4	41	45	10
1915	19	14	59	8
1916	9	17	66	8
1917	10	15	71	4
1918	30	16	45	9
1919	7	22	65	6
1920	8	14	72	6
Averages	12	20	62	6

An analysis of the entire run is presented in the two tables which follow, based on 974 individuals, taken by random samplings at weekly intervals from July 18th to August 22nd. The lengths and weights are given for males and females separately of each of the seven year-groups represented in the run. The seven-year type, three years in lake, usually found in Nass River runs, furnished no representatives in 1920. The sea-type, the young of which proceed to sea directly on hatching, had but two representatives in our samples, one for each year-group. While this type is never abundant, it contained more representatives in 1919 than the three-years-in-lake type.

Table XLVIII.—Nass River Sockeyes which ran in 1920, grouped by Age, Sex, and Length, and by their Early History.

Length in Inches.	Number of Individuals.													
	One-year-in-lake Type.				Two-years-in-lake Type.				Three-years-in-lake Type.		No Year in Lake (Sea-type).			
	Four Years old.		Five Years old.		Five Years old.		Six Years old.		Six Years old.		Three Years old.		Four Years old.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
21	1	..	..	..	..	..	..	..	..	..	..	..	..	..
21½	..	2	..	..	..	..	..	..	..	..	..	..	..	..
22	..	3	..	..	1	3	..	..	..	..	..	..	..	..
22½	3	5	..	..	..	6	..	..	..	..	..	..	..	..
23	2	3	..	2	3	6	..	..	..	..	..	..	..	..
23½	9	12	..	6	4	5	1	..	..	..	..	1	..	..
24	6	10	2	9	8	15	2	3	..	..	..	..	..	1
24½	5	1	4	13	7	21	1	2	..	..	..	..	..	..
25	2	2	6	24	11	45	5	3	..	..	..	..	..	..
25½	5	..	4	11	10	58	5	4	1	1	..	..	..	..
26	..	1	5	7	40	110	2	2	2	3	..	..	..	..
26½	..	..	13	5	35	59	1	..	2	..	..	..	..	..
27	..	..	7	4	67	48	1	2	4	4	..	..	..	..
27½	..	..	4	..	45	15	1	3	2	1	..	..	..	..
28	..	..	5	..	28	14	4	1	..	1	..	..	..	..
28½	..	..	1	..	12	1	4	1	..	..	..	..	..	..
29	..	..	..	..	5	1	7	..	..	..	..	..	..	..
29½	..	..	..	..	1	1	2	..	..	..	..	..	..	..
30	..	..	..	..	..	..	2	..	..	..	..	..	..	..
30½	..	..	..	..	..	..	2	..	..	..	..	..	..	..
31	..	..	..	..	..	..	1	..	..	..	..	..	..	..
Totals	33	39	51	81	277	408	41	21	11	10	..	1	..	1
Ave. lengths	24.0	23.4	26.3	25.0	26.7	25.9	27.4	25.9	26.6	26.7	..	..	..	..

Table XLIX.—Nass River Sockeyes which ran in 1920, grouped by Age, Sex, and Weight, and by their Early History.

Weight in Pounds.	Number of Individuals.													
	One-year-in-lake Type.				Two-years-in-lake Type.				Three-years-in-lake Type.		No Year in Lake (Sea-type).			
	Four Years old.		Five Years old.		Five Years old.		Six Years old.		Six Years old.		Three Years old.		Four Years old.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
4	1	3	..	..	..	3	..	..	..	..	..	..	..	..
4½	3	5	..	2	2	4	..	..	..	..	..	..	..	1
5	5	10	..	4	3	18	..	1	..	..	..	..	..	..
5½	10	12	2	11	12	37	1	2	..	..	..	1	..	..
6	8	7	4	25	11	80	4	..	..	1	..	..	..	..
6½	4	1	10	18	30	93	6	8	1	3	..	..	..	..
7	1	..	4	8	51	93	4	2	2	4	..	..	..	..
7½	1	1	11	9	72	51	6	4	5	2	..	..	..	..
8	..	..	9	3	59	22	2	1	1	..	..	..	..	..
8½	..	..	6	1	29	6	5	1	1	..	..	..	..	..
9	..	..	5	..	8	1	7	2	1	..	..	..	..	..
9½	..	..	..	..	..	..	3	..	..	..	..	..	..	..
10	..	..	..	..	..	..	1	..	..	..	..	..	..	..
10½	..	..	..	..	..	..	1	..	..	..	..	..	..	..
11	..	..	..	..	..	..	1	..	..	..	..	..	..	..
11½	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Totals	33	39	51	81	277	408	41	21	11	10	..	1	..	1
Ave. weights	5.6	5.2	7.4	6.3	7.4	6.7	7.9	7.0	7.6	6.9	..	..	..	..

The relative sizes of the different types and year-classes are in general similar in successive seasons if we consider the runs as a whole, but the variations in this respect are extreme from one end of a fishing season to the other. For this reason numerous samplings are necessary to give us satisfactory data concerning the construction of the run.

These changes in the relative abundance of the year-groups in different portions of the run occur in fairly uniform sequence in different years, as can be seen on comparing the following table with similar tables in our previous reports in this series. The sea-type and the one-year-in-lake type, with their four year-classes, appear most numerously in the earlier half of the run. Representatives of the sea-type are among the earliest to enter—a fact which may account for the small numbers to appear in our samples in 1920, our first sample dating past the middle of July. The two-years-in-lake and the three-years-in-lake types show a distinct tendency to run late in greatest numbers.

Table L.—Percentages in each Class of Nass River Sockeyes running at Different Dates in 1920.

Date.	One Year in Lake.		Two Years in Lake.		Three Yrs. in Lake.		Sea-type.	Number of Individuals examined.
	Four Years old.	Five Years old.	Five Years old.	Six Years old.	Six Years old.	Three Years old.	Four Years old.	
July 18.....	15	33	35	18	..	1	1	121
„ 25.....	18	24	44	12	2	..	..	171
Aug. 1.....	11	23	58	7	1	..	..	124
„ 8.....	6	10	75	5	4	..	..	174
„ 15.....	..	1	96	1	2	..	..	298
„ 22.....	..	..	94	2	4	..	..	86

(3.) Proportions of the Sexes.

In the 1920 run the females outnumbered the males in all except one wholly unimportant year-group. The total number of males in our six samplings constituted 47 per cent. and the females 53 per cent. of the run.

Considerable diversity has occurred in this regard in different years. Considering the four principal year-classes only, we find that the four-year class, one-year-in-lake type has more males than females in every year of which records are available, except in 1920; the five-year class of the same type has always the reverse condition, with more females than males; the five-year class, two-years-in-lake type has a distinct excess of males in three years out of seven, an equal excess of females in two of the above years, including 1920, and an essential equality of the sexes the remaining two years; the six-year class of this type is always poorly represented, so averages are uncertain, but our material shows a distinct tendency toward excess of males.

(4.) Lengths and Weights.

The Nass River sockeyes of 1920 were of average size or above, the slight deficiency in both male and female four-year fish being more than compensated for by noticeable excess above the averages in the other year-groups.

The following tables of lengths and weights give a comparative view over a number of years. The reliability of our data for 1920 is attested by the agreement in every group shown in the two tables. Wherever the lengths are above or below the average as given, the weights are correspondingly above or below the average obtained from a series of years.

Table LI.—Nass River Sockeyes, Average Lengths of Different Classes from 1912 to 1920.

Year.	One Year in Lake.				Two Years in Lake.			
	Four Years old.		Five Years old.		Five Years old.		Six Years old.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
1912 (inches)	24.6	23.3	26.5	25.1	26.2	25.4	27.0	25.6
1913 „	24.1	23.5	25.6	24.8	26.0	25.2	26.0	26.6
1914 „	24.6	22.7	26.1	25.1	26.3	25.5	26.9	25.6
1915 „	24.0	23.5	25.9	25.2	26.5	25.9	26.6	25.3
1916 „	24.5	23.3	26.4	25.0	26.5	25.6	27.9	25.7
1917 „	23.4	23.2	25.5	24.7	25.3	24.7	26.5	25.5
1918 „	25.0	24.3	25.7	24.7	25.9	25.0	27.2	25.2
1919 „	24.9	24.1	26.2	25.2	26.5	25.8	27.9	26.7
1920 „	24.0	23.4	26.3	25.0	26.7	25.9	27.4	25.9
Total averages...	24.3	23.5	26.0	25.0	26.2	25.4	27.0	25.8

Table LII.—Nass River Sockeyes, Average Weights of Different Classes from 1912 to 1920.

Year.	One Year in Lake.				Two Years in Lake.			
	Four Years old.		Five Years old.		Five Years old.		Six Years old.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
1913 (pounds) ...	5.5		6.3		6.5		6.7	
1914 „ ...	6.2	5.0	7.4	6.5	7.2	6.5	7.9	6.8
1915 „	5.6	5.2	6.9	6.4	7.0	6.6	7.2	6.5
1916 „	6.0	5.3	7.2	6.3	7.2	6.2	8.1	6.4
1917 „	5.3	5.3	6.8	6.2	6.3	5.8	7.3	6.4
1918 „ ...	6.3	5.8	7.2	6.3	7.2	6.4	8.3	6.7
1919 „	6.0	5.5	6.6	5.9	6.7	6.1	7.8	6.7
1920 „ ...	5.6	5.2	7.4	6.3	7.4	6.7	7.9	7.0
Total averages...	5.8	5.3	7.1	6.3	7.0	6.3	7.8	6.7

In previous reports we have called attention to the fact that the August part of the run may often be distinguished sharply from the part of the run that precedes the first of August. The differences are often clearly marked in the two series in the centres of the scales, which record the early history of the fish in fresh water, and a further difference is found in the decidedly larger size of the August fish. The latter difference may be exemplified in the 1920 run by the average size of the females of the dominant type in different parts of the run. The dominant type consists of five-year individuals that had spent their first two years in fresh water.

	July 18.	July 25.	Aug. 1.	Aug. 8.	Aug. 15.	Aug. 22.
Average lengths	24.8	24.8	25.4	25.8	26.4	25.9
Average weights	6.1	6.1	6.4	6.5	6.9	6.3

We have not previously in these studies plotted weights against lengths in any group to ascertain the amount of variation that exists in the weights of fish having the same length and other facts of interest in connection with this distribution. In the following tables we have done this for the dominant Nass River group, which consists, as we have shown, of five-year individuals, which spent their first two years in their lake before descending to sea. In the tables the males and females are treated separately, and for purposes of comparison similar data are given also for the year 1919.

On each of the horizontal lines of the table is given the number of individuals which have the length stated at the left end of the line and the weights as given at the tops of the columns. The variation in weight of fish of equal length is astonishingly great. In Table LV. it is shown, for example, that male salmon of this group, captured in 1919, 26½ inches long, varied from 5 to 8 lb. in weight. The right-hand column gives the average weights for the different lengths. That these increase together is of course inevitable, as is also the fact of a regular progressive increase. The irregularities in our table are wholly due to the small number of individuals in certain of the categories, and largely disappear in the first table in the groups between 25 and 28 inches, where the numbers are large enough to give fairly reliable averages. When this series of numbers is smoothed it is seen that in 1919, in this group of male sockeyes, an increase of ½ inch in the length caused a corresponding increase of 0.3 lb.

This method of handling the data makes possible a direct comparison of the weights of males and females of equal length. The general impression prevails that female fish are plumper and therefore heavier than males if material of equal length is chosen. It is a matter of observation that the snouts of the males are sharper and appear longer, even in the earlier phases of the run. This characteristic would also tend to decrease weight relative to length. But the result of our tabulation was exactly the reverse of what we had anticipated. For every length which the males and females have in common the males average heavier than the females, a fact that holds equally in 1919 and in 1920.

To bring these facts together in small compass and in simplified form, we repeat below the average weights from the four tables, having first smoothed each set by threes.

Table LIII.

Inches.	1919.		1920.	
	Males.	Females.	Males.	Females.
	Lb.	Lb.	Lb.	Lb.
24	5.2	5.1	5.8	5.5
24½	5.5	5.3	6.0	5.8
25	5.7	5.6	6.2	6.0
25½	6.0	5.9	6.7	6.4
26	6.3	6.2	6.9	6.7
26½	6.6	6.5	7.3	7.0
27	6.9	6.7	7.6	7.3
27½	7.2	6.9	7.9	7.7
28	7.5	..	8.2	8.0

Table LIV.—Length and Weight, Distribution of Male Nass River Sockeyes, 1919, Five Years old, Two Years in Lake.

Length in Inches.	Weight in Pounds.									Average Weights.
	5.	5½.	6.	6½.	7.	7½.	8.	8½.	9.	
23	..	..	1	..	..	..	..	..	..	..
23½	..	..	..	..	1	..	..	..	..	..
24	4	..	1	..	..	..	..	..	..	5.2
24½	2	3	2	2	..	..	..	..	..	5.7
25	3	9	10	2	..	..	..	..	..	5.7
25½	1	9	22	17	4	..	..	..	..	6.1
26	..	13	30	35	17	2	..	..	..	6.3
26½	1	9	17	18	29	12	1	..	..	6.6
27	..	..	12	16	30	21	5	3	..	7.0
27½	..	..	4	7	16	19	3	3	1	7.2
28	..	..	..	6	8	5	15	1	..	7.5
28½	..	..	..	..	..	1	3	..	..	7.9
29	..	..	..	..	..	..	..	..	..	..
29½	..	..	..	..	..	..	..	1	..	..
Ave. lengths .	24.8	25.7	26.0	26.3	26.8	27.1	27.8	27.6	..	..

Table LV.—Length and Weight Distribution of Female Nass River Sockeyes, 1919, Five Years old, Two Years in Lake.

Length in Inches.	Weight in Pounds.									Average Weights.
	4.	4½.	5.	5½.	6.	6½.	7.	7½.	8.	
23	..	1	3	..	..	..	..	..	..	4.9
23½	..	..	3	2	..	..	..	..	..	5.2
24	..	..	12	3	..	..	..	..	..	5.1
24½	..	1	16	15	3	..	..	..	..	5.3
25	1	1	15	54	23	6	..	..	..	5.6
25½	..	..	9	26	48	15	3	..	..	5.8
26	..	..	2	23	53	41	20	1	..	6.2
26½	..	..	1	9	25	30	26	3	..	6.4
27	..	..	..	1	8	14	19	22	1	6.9
27½	..	..	..	..	2	2	3	4	..	6.9
28	..	..	..	..	..	..	..	..	..	..
28½	..	..	..	..	..	..	1	..	..	..
Ave. lengths	..	..	24.6	25.3	25.8	26.2	26.5	27.0	..	..

Table LVI.—Length and Weight Distribution of Male Nass River Sockeyes, 1920, Five Years old, Two Years in Lake.

Length in Inches.	Weight in Pounds.										Average Weights.
	4½.	5.	5½.	6.	6½.	7.	7½.	8.	8½.	9.	
22	1	..	..	..	..	..	..	..	..	..	4.2
22½	..	..	..	..	..	..	..	..	..	..	..
23	..	2	..	..	..	..	..	..	..	..	5.0
23½	..	1	2	1	..	1	..	..	..	..	5.8
24	..	..	5	2	1	..	..	..	..	..	5.8
24½	1	..	2	3	..	..	..	..	..	..	5.6
25	..	..	..	2	7	2	..	..	..	..	6.5
25½	..	..	1	1	5	3	..	..	..	..	6.5
26	..	..	1	1	8	20	10	1	..	..	7.0
26½	..	..	..	..	5	12	15	2	..	..	7.2
27	..	..	..	..	5	8	29	21	3	..	7.6
27½	..	..	..	..	..	2	12	19	9	1	7.9
28	..	..	..	..	..	1	3	12	8	2	8.1
28½	..	..	..	..	..	..	..	..	6	5	8.7
29	..	..	..	..	..	..	..	..	1	2	8.8

Table LVII.—Length and Weight Distribution of Female Nass River Sockeyes, 1920, Five Years old, Two Years in Lake.

Length in Inches.	Weight in Pounds.											Average Weights.
	4.	4½.	5.	5½.	6.	6½.	7.	7½.	8.	8½.	9.	
22	2	1	..	..	..	..	..	..	..	..	..	4.1
22½	..	1	3	2	..	..	..	..	..	..	..	5.1
23	..	2	1	3	..	..	..	..	..	..	..	5.1
23½	..	..	3	1	1	..	..	..	..	..	..	5.3
24	..	..	3	7	6	..	..	..	..	..	..	5.6
24½	..	..	3	10	5	..	1	..	..	..	..	5.6
25	..	..	..	6	22	9	2	1	..	..	..	6.1
25½	..	..	..	2	22	19	10	1	..	..	..	6.4
26	..	..	..	1	11	54	38	8	..	..	..	6.7
26½	..	..	..	..	1	15	20	16	1	..	..	7.0
27	..	..	..	..	..	5	15	15	9	..	..	7.3
27½	..	..	..	..	..	..	1	8	3	2	..	7.7
28	..	..	..	..	..	..	..	2	8	3	..	8.0
28½	..	..	..	..	..	..	..	..	1	..	..	..
29	..	..	..	..	..	..	..	1	..	..	..	..
29½	..	..	..	..	..	..	..	..	..	..	1	..

THE SOCKEYE RUN TO THE NASS RIVER IN 1921.

(1.) General Characteristics and the Age-groups.

No facts are known to us which can in any degree explain the phenomenally poor run of sockeyes to the Nass River in 1921. The principal brood-year for 1921 was 1916, when a pack of over 31,000 cases was put up, and the spawning-grounds were reported to be abundantly populated when inspected in the fall of that year.

Fears have been frequently expressed during the last few years lest the future of the river might be menaced by American traps located at projecting points along the northern side of Dixon Entrance. That certain of these traps do intercept the schools of Nass River sockeyes cannot be questioned. But they were in no way responsible for the shortage in 1921. Had they made serious inroads on the brood-year, 1916, the canneries at the mouth of the river could not have made a full pack, as they did in that year. As for 1921, the American traps were not driven and the Nass fish were undisturbed. An occasional floating trap was installed in the region in question, but the few sockeyes we were able to examine from their captures were certainly not bound for the Nass River. The poor packs on Rivers Inlet and the Skeena in 1921 could be anticipated from the history of these streams in 1916 and 1917. But the occurrence of a similar shortage in the Nass River remains totally unexplained.

The material that served for the following analysis of the run was gathered by random sampling on twenty different periods, selected at close intervals throughout the season. The total number of individuals examined was 1,797 and the dates extend from June 28th to August 19th.

Seven year-classes were present in the 1921 run, as shown in the two following tables. in which the individuals comprising these classes are shown grouped according to sex, length, and weight. The seven-year-old class, which spends three years in the lake as fingerlings, is always in very small numbers when present. No individuals of this class were found among our samples in either 1920 or 1921.

Table LVIII.—Nass River Sockeyes which ran in 1921, grouped by Age, Sex, and Length, and by their Early History.

Length in Inches.	Number of Individuals.													
	One-year-in-lake Type.				Two-Years-in-lake Type.				Three-years-in-lake Type.		No Year in Lake (Sea-type).			
	Four Years old.		Five Years old.		Five Years old.		Six Years old.		Six Years old.		Three Years old.		Four Years old.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
19	..	..	..	..	..	..	..	..	..	..	..	1	..	..
19½	..	..	..	..	..	..	..	..	..	..	..	..	..	..
20	..	..	..	..	..	..	..	..	..	..	..	..	..	..
20½	..	..	..	..	..	..	..	..	..	..	..	2	..	..
21	..	..	..	..	..	..	..	..	..	..	..	..	..	..
21½	..	3	..	..	..	1	..	..	..	..	..	..	..	..
22	2	10	..	2	2	3	..	..	..	..	..	2	..	..
22½	7	9	..	2	1	6	..	..	..	..	3	1	..	2
23	5	19	2	8	5	19	..	4	..	..	1	1	1	2
23½	8	21	5	11	14	16	1	1	..	..	2	1	1	2
24	12	18	5	12	15	45	1	3	..	..	..	1	..	1
24½	11	10	5	7	33	70	1	3	..	1	1	..	1	2
25	5	7	12	14	57	87	2	6	1	2	..	..	2	1
25½	13	3	8	12	85	119	..	4	2	1	..	..	..	..
26	2	1	7	2	98	115	6	7	..	2	..	..	..	..
26½	2	1	3	1	95	96	4	7	2	3	..	1	..	..
27	1	..	4	..	93	68	7	12	2	3	..	..	..	..
27½	..	..	5	1	47	30	7	8	4	1	..	..	..	..
28	..	..	2	..	33	14	9	3	1	..	..	..	..	..
28½	..	..	..	..	19	3	13	2	..	1	..	..	..	..
29	..	..	1	..	8	..	14	2	1	1	..	..	..	..
29½	..	..	..	..	2	..	4	..	..	..	..	..	..	..
30	..	..	..	..	1	..	3	1	..	..	..	..	..	..
30½	..	..	..	..	..	..	1	..	..	..	..	..	..	..
Totals	68	102	59	72	608	692	73	63	13	15	7	10	5	10
Average lengths	24.3	23.5	25.5	24.3	26.2	25.6	27.9	26.2	26.9	26.5	23.1	22.4	24.2	23.6

Table LIX.—Nass River Sockeyes which ran in 1921, grouped by Age, Sex, and Weight, and by their Early History.

Weight in Pounds.	Number of Individuals.													
	One-year-in-lake Type.				Two-Years-in-lake Type.				Three-years-in-lake Type.		No Year in Lake (Sea-type).			
	Four Years old.		Five Years old.		Five Years old.		Six Years old.		Six Years old.		Three Years old.		Four Years old.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
3	..	..	..	..	..	..	..	..	..	..	1	1	..	..
3½	..	..	..	..	..	..	..	..	..	..	..	1	..	..
4	..	2	..	..	..	1	..	..	..	..	..	2	..	..
4½	2	10	1	1	1	5	..	..	..	..	..	1	..	1
5	14	35	1	7	16	49	2	2	..	..	3	3	1	4
5½	12	27	3	16	31	117	1	12	1	2	2	1	..	1
6	15	16	11	20	76	201	4	13	2	3	1	..	3	2
6½	13	10	12	15	135	129	5	11	3	4	..	..	1	1
7	5	1	8	7	132	110	11	8	1	5	..	1	..	1
7½	6	..	11	3	122	59	12	12	4	1	..	..	..	..
8	1	1	6	2	63	18	17	1	1	..	..	..	..	..
8½	..	..	4	..	22	3	7	2	..	..	..	..	..	..
9	..	..	1	1	9	..	9	1	1	..	..	..	..	..
9½	..	..	1	..	1	..	4	1	..	..	..	..	..	..
10	..	..	..	..	..	..	1	..	..	..	..	..	..	..
10½	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Totals	68	102	59	72	608	692	73	63	13	15	7	10	5	10
Average weights	6.0	5.4	6.9	6.1	6.9	6.3	7.7	6.6	7.0	6.5	5.0	4.6	5.9	5.5

The percentages of the four principal groups in the 1921 run diverged sharply from the average in one respect. The five-year class of the one-year-in-lake type was very scantily represented. Whereas it usually comprises a fifth or more of the run, in 1921 it contributed little more than a fifteenth. It was even less numerous than either the four- or the six-year classes, although it usually outnumbers both of these combined. It was proportionally far smaller than in the nine previous years of which we have record, while the other five-year class was correspondingly more numerous than ever before.

Table LX.

Year.	Percentage of Individuals that spent			
	One Year in Lake.		Two Years in Lake.	
	Four Years old.	Five Years old.	Five Years old.	Six Years old.
1912	8	27	63	2
1913	15	12	71	2
1914	4	41	45	10
1915	19	14	59	8
1916	9	17	66	8
1917	10	15	71	4
1918	30	16	45	9
1919	7	22	65	6
1920	8	14	72	6
1921	10	7	75	8

In the following table we give again the percentages, on a large number of dates throughout the season of 1921, of each class of sockeyes then comprised in the run. The table displays the entrances and the exits of groups and the period during the run when they attained their maximum numbers. It is to be noted that at the opening of the fishing season the two one-year-in-lake classes were present in small numbers only, that the two classes increased in parallel fashion until they reached their maximum numbers during the third week in July, and then rapidly decreased until they almost wholly disappeared in August. Their parallel history during the season is a striking phenomenon. The two six-year classes also progressed proportionally, being absent or nearly so on the early days of the run and increasing toward the close, the class belonging to the three-years-in-lake type entering later than the other. The two sea-type classes were present only during the first two weeks of the season. The principal class of five-year-olds does not vary significantly during the season.

Table LXI.—Percentages in each Class of Nass River Sockeyes running at Different Dates in 1921.

Date.	One Year in Lake.		Two Years in Lake.		Three Years in Lake.	Sea-type.		Number of Individuals examined.
	Four Years old.	Five Years old.	Five Years old.	Six Years old.	Six Years old.	Three Years old.	Four Years old.	
June 28	6	2	83	..	..	5	4	122
July 1	5	6	79	2	..	5	3	125
July 7, 8	8	8	79	..	..	2	3	123
July 9	11	6	80	..	..	3	..	99
July 11	19	7	66	6	1	..	1	122
July 13, 14	17	21	57	4	..	..	1	125
July 16	28	36	36	..	..	..	..	25
July 18	20	18	56	5	1	..	..	95
July 20	22	11	62	5	..	..	..	100
July 22	6	9	77	6	2	..	..	47
July 26	17	8	63	12	..	..	..	72
July 29	8	8	67	17	..	..	..	125
July 30	16	4	64	14	2	..	..	49
Aug. 1	7	1	83	8	1	..	..	74
Aug. 5	5	2	86	4	6	..	..	98
Aug. 6	1	..	80	16	3	..	..	69
Aug. 8	1	2	79	16	2	..	..	174
Aug. 13	..	3	79	14	4	..	..	67
Aug. 16	3	..	67	22	8	..	..	36
Aug. 19	..	2	74	12	12	..	..	50
No. individuals	170	131	1,300	136	28	17	15	1,797
Percent. each class	9	7	72	8	2	1	1	..

(2.) Lengths and Weights.

Table LXII.—Nass River Sockeyes, Average Lengths of Different Classes from 1912 to 1921.

Year.	One Year in Lake.				Two Years in Lake.			
	Four Years old.		Five Years old.		Five Years old.		Six Years old.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
1912 (inches)	24.6	23.3	26.5	25.1	26.2	25.4	27.0	25.6
1913 ,,	24.1	23.5	25.6	24.8	26.0	25.2	26.0	26.6
1914 ,,	24.6	22.7	26.1	25.1	26.3	25.5	26.9	25.6
1915 ,,	24.0	23.5	25.9	25.2	26.5	25.9	26.6	25.3
1916 ,,	24.5	23.3	26.4	25.0	26.5	25.6	27.9	25.7
1917 ,,	23.4	23.2	25.5	24.7	25.3	24.7	26.5	25.5
1918 ,,	25.0	24.3	25.7	24.7	25.9	25.0	27.2	25.2
1919 ,,	24.9	24.1	26.2	25.2	26.5	25.8	27.9	26.7
1920 ,,	24.0	23.4	26.3	25.0	26.7	25.9	27.4	25.9
1921 ,,	24.3	23.5	25.5	24.3	26.2	25.6	27.9	26.2

Table LXIII.—Nass River Sockeyes, Average Weights of Different Classes from 1913 to 1921.

Year.	One Year in Lake.				Two Years in Lake.			
	Four Years old.		Five Years old.		Five Years old.		Six Years old.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
1913 (pounds)	5.5		6.3		6.5		6.7	
1914 „	6.2	5.0	7.4	6.5	7.2	6.5	7.9	6.8
1915 „	5.6	5.2	6.9	6.4	7.0	6.6	7.2	6.5
1916 „	6.0	5.3	7.2	6.3	7.2	6.2	8.1	6.4
1917 „	5.3	5.3	6.8	6.2	6.3	5.8	7.3	6.4
1918 „	6.3	5.8	7.2	6.3	7.2	6.4	8.3	6.7
1919 „	6.0	5.5	6.6	5.9	6.7	6.1	7.8	6.7
1920 „	5.6	5.2	7.4	6.3	7.4	6.7	7.9	7.0
1921 „	6.0	5.4	6.9	6.1	6.9	6.3	7.7	6.6

In the two tables which precede we have given the average lengths and the average weights of Nass River sockeyes for a term of years. These show in general a close correspondence in the averages of the different age-groups, especially in those groups that are most numerously represented in every run. The annual averages in these are more reliable than in groups with smaller numbers and are less subject to the chance variations of limited random sampling. The groups with smaller numbers are always those of the sea-type and those that remain three years in the lake after hatching. As each of these types contains two distinct year-groups and the males and females of each year-group are listed separately, each category has very few individuals. In 1921 the three year-groups of these two types combined contained only sixty individuals and the categories ranged from five to fifteen. Averages based on such very limited material are of little value for any one year. It is only by summing up the averages of a long series of years that we obtain a reliable index of the sizes characteristic of the members of these year-groups.

The dominant classes in the Nass are the four-year group and the five-year group of the one-year-in-lake type and the five-year and six-year groups of the two-years-in-lake type. Together these constituted in 1921 approximately 97 per cent. of the run. Their lengths and weights, which we compare in the following tables with the general averages derived from our records since 1912, indicate that they had had a normal existence in the sea and were as well nourished as average representatives of their respective groups in any year. There is no reason to believe that the phenomenally small run in 1921 was due in any measure to adverse conditions that affected injuriously the growth of the fish.

Table LXIV.—Average Weights of Nass River Sockeyes, 1921, compared with General Averages of 1914 to 1919.

	Average Weights, 1921.	General Averages, 1914 to 1919.
One year in lake—		
Four-year males	6.0	5.9
Four-year females	5.4	5.4
Five-year males	6.9	7.0
Five-year females	6.1	6.3
Two years in lake—		
Five-year males	6.9	6.9
Five-year females	6.3	6.3
Six-year males	7.7	7.8
Six-year females	6.6	6.6

Table LXV.—Average Lengths of Nass River Sockeyes, 1921, compared with General Averages of 1912 to 1919.

	Average Lengths, 1921.	General Averages, 1912 to 1919.
One year in lake—		
Four-year males	24.3	24.4
Four-year females	23.5	23.5
Five-year males	25.5	25.9
Five-year females	24.3	25.0
Two years in lake—		
Five-year males	26.2	26.2
Five-year females	25.6	25.4
Six-year males	27.9	27.0
Six-year females	26.2	25.8

It is a remarkable fact that the averages in size taken for the entire season compare so closely between one year and the next, while yet such very extensive fluctuations in size occur each year during the continuance of the run. The causes for these fluctuations are obscure. In some cases, undoubtedly, they have to do with racial differences and the disparity in size which may characterize colonies bound for distinct tributary streams. The more extensive fluctuations may well be ascribed to this cause, but there are minor changes in size from day to day or week to week, too numerous and often too slight, to make plausible such an explanation.

In the two tables below and in the graph which follows we illustrate the fluctuations in size by dividing the run into eleven periods, and giving for each of these the distribution of individuals taken during such period. Males and females are given separately. It might be considered that the apparent changes in average size were due to the vagaries of chance sampling, were it not that the frequency distributions display a fair symmetry, in whatever part of the scale they may occur; and for the additionally significant fact that the fluctuations of male and female lengths throughout the series of dates are parallel. As all the measurements were taken by the same observer, the average errors due to observation should be the same in different samples. It is possible the minor differences in size are in part due to the arrival of different schools of fish that have lived together in the sea and have fed better or worse than schools which precede or follow them in the run.

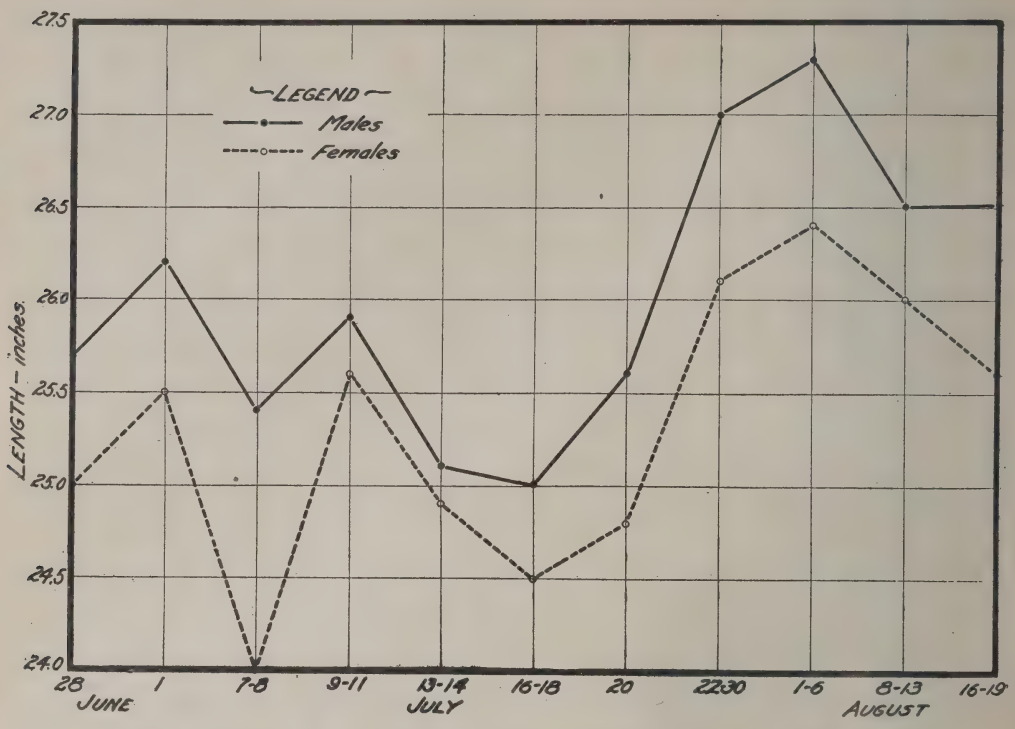
The group chosen for the following tables is the largest group present on the Nass River run, consisting of five-year fish that remained in the lake for two years after hatching. This group comprised numerically 72 per cent. of the run in 1921.

Table LXVI.—Nass River Male Sockeyes, 1921, in Fifth Year, Two-year-in-lake Type, arranged by Lengths on a series of Dates.

Inches.	June 28.	July 1.	July 7, 8.	July 9, 11.	July 13, 14.	July 16, 18.	July 20.	July 22, 26, 29, 30.	Aug. 1, 5, 6.	Aug. 8, 13.	Aug. 16, 19.
21	..	..	..	..	..	..	..	..	..	..	..
21½	..	..	..	..	..	..	..	..	..	..	..
22	..	..	..	..	2	..	..	..	..	..	..
22½	..	..	..	..	..	1	..	..	..	..	..
23	..	..	..	1	2	2	..	..	..	..	..
23½	..	..	5	3	2	3	1	..	..	..	..
24	..	1	5	1	3	1	3	..	1	..	..
24½	3	2	8	4	3	5	2	..	2	2	2
25	8	1	12	14	5	2	4	3	1	6	1
25½	20	7	8	15	6	4	6	5	5	7	2
26	11	11	6	16	6	9	6	7	6	14	6
26½	10	6	5	17	2	3	2	18	11	13	8
27	1	11	..	13	1	..	4	23	15	20	5
27½	..	2	1	3	1	..	..	13	18	8	1
28	..	..	..	..	1	..	1	13	10	4	4
28½	..	..	..	1	..	..	..	1	13	3	..
29	..	..	..	..	..	..	..	3	5	..	..
29½	..	..	..	..	..	..	..	..	2	..	..
30	..	..	..	..	..	..	..	..	1	..	..
Totals	53	41	51	88	34	30	29	86	90	77	29
Average lengths ...	25.7	26.2	25.4	25.9	25.1	25.0	25.6	27.0	27.3	26.5	26.5

Table LXVII.—Nass River Female Sockeyes, 1921, in Fifth Year, Two-years-in-lake Type, arranged by Lengths on a Series of Dates.

Inches.	June 28.	July 1.	July 7, 8.	July 9, 11.	July 13, 14.	July 16, 18.	July 20.	July 22, 26, 29, 30.	Aug. 1, 5, 6.	Aug. 8, 13.	Aug. 16, 19.
21	..	..	..	..	..	..	..	..	..	..	..
21½	..	..	..	..	..	..	1	..	..	..	..
22	..	..	1	1	1	..	..	..	..	..	..
22½	..	..	4	..	..	1	1	..	..	..	..
23	..	..	9	..	4	5	1	..	..	..	..
23½	2	..	7	1	1	2	2	..	..	..	1
24	7	2	3	5	4	5	3	5	4	4	3
24½	11	7	12	6	4	6	7	2	2	7	4
25	12	5	3	14	6	2	10	13	6	14	4
25½	10	26	5	14	9	5	1	17	10	18	4
26	4	10	1	15	3	6	4	21	19	25	7
26½	1	6	1	8	4	..	1	25	25	19	6
27	1	2	..	4	1	..	1	20	22	16	1
27½	..	..	..	4	..	..	..	5	13	7	1
28	..	..	..	..	..	..	1	2	8	2	1
28½	..	..	..	..	..	..	..	..	1	2	..
29	..	..	..	..	..	..	..	..	..	..	..
Totals	48	58	46	72	37	32	33	110	110	114	32
Average lengths ...	25.0	25.5	24.0	25.6	24.9	24.5	24.8	26.1	26.4	26.0	25.6



Variations in average size of Nass River sockeyes, five-year-old class, two years in lake, at different periods in the run of 1921.

Inspection of the graph makes evident the sudden and extensive increase in length which characterized the late-running fish. In a period of only two days, from July 20th to the 22nd, the average length of the males increased nearly 1½ inches, from 25.6 to 27 inches, and the females a similar amount, from 24.8 to 26.1 inches. They remained nearly constant at this new level, but in both sexes with distinct additional increase, for a period of over two weeks, when the size again diminished.

This is one of the major fluctuations referred to on a previous page as probably of racial origin. A similar phenomenon has been observed in the run of previous years and ascribed to the same cause. In our report for 1915 (1916, page 60) we state: "The outstanding feature of the run of 1915 was its sharp division into an early and a late period, the two exhibiting very distinct characteristics. The second period was marked by a new run of conspicuously larger fish appearing after the middle of the season, in the final days of July or during the first of August." We there called attention to a difference manifested by the larger late-running fish of 1915 in the character of the central area of the scales, which records growth in fresh water. A different habit of growth in fresh water, taken in connection with distinctive size and definite appearance in the run, warranted the assumption that we had to do with a distinct race, bound either for Meziadin or Bowser Lake, the only two spawning areas known in this watershed. The difficulties in the way of adequate exploration of the Nass River basin have thus far prevented a determination of this matter by examining the spawning populations of the two lakes.

THE SPAWNING-BEDS OF THE FRASER RIVER.

Hon. William Sloan,
Commissioner of Fisheries, Victoria, B.C.

SIR,—I have the honour to submit the following report of my annual inspection of the salmon-spawning area of the Fraser River basin during the season of 1921:—

I made my eighteenth annual inspection of the principal spawning area of the Fraser River basin during July, August, September, and October. Major J. A. Motherwell, Chief Inspector of Fisheries for the Dominion in the Province, accompanied me over the greater portion of the area. I am indebted to him and his assistants, and also to many local residents, both white and Indian, scattered over the basin, for information of value.

For the past three years the Indian residents on the Fraser, above the commercial fishing limits at Mission Bridge, have been prohibited from catching salmon. Previous to three years ago the Indians above Mission Bridge were permitted to take fish for their own use. They maintained regular fishing-stations in the canyon above Yale, in the canyon above the mouth of Bridge River, at Soda Creek and Quesnel on the Fraser, at three stations on the Chilcotin River, and also at numerous points on the Thompson River. By observations made at these stations valuable data as to the time, duration, and abundance of the salmon run were easily obtained. But since then they no longer fish openly, and such data are therefore difficult to obtain, and when obtained are far less satisfactory.

By authority granted by the Minister in Ottawa, this Department was permitted to use a gill-net daily in the Fraser near New Westminster, and in the Harrison at the rapids above Harrison Mills, during the months of May and June, during which time commercial fishing for sockeye is prohibited. This work was undertaken in order to ascertain if any considerable number of sockeye entered the Fraser during those months. By this means it was demonstrated that no run of sockeye entered the Fraser in May and June this year. No sockeye were taken in the nets used in the Harrison and less than twenty in the nets employed in the Fraser.

Sockeye made their appearance at Hell's Gate in the Fraser Canyon above Yale late in July and were observed there during August and September. The run was greatest in August. I visited the canyon several times in August and September and was twice accompanied by Major Motherwell. At no time this season were sockeye observed there in as large numbers as in 1920. Dominion Fishery Officer Scott, who has been detailed to patrol that canyon for the past seven years, reported to Major Motherwell that the number of sockeye that passed through Hell's Gate this year was less than last year. The run during last season is believed to have been larger than in the preceding year. Water conditions at Hell's Gate throughout this season were most favourable for the passage of fish. The fish were not delayed there at any time. No pink salmon were seen at Hell's Gate during the season, nor have any been observed there, or in the waters above, since 1913. The number of spring salmon seen at Hell's Gate this year was larger than usual.

It has been stated in the press that the sockeye that pass through the Fraser Canyon to the waters above enter the Fraser annually in July, and that the August run to the Fraser spawns annually in the tributaries of that stream below Hell's Gate. Such is not the case. Every season since our observations began in 1901 more sockeye have been seen at Hell's Gate in August and September, and in some years in October, than at any time in the month of July. In 1901 and again in 1905 there was a good run of sockeye through the canyon in November, and they have been seen there in December.

The number of sockeye that entered Quesnel Lake this year was much more difficult to determine than in any year since my observations began in 1901. The great dam that was built at the outlet of the lake in 1898 was virtually removed in May of this year by the Public Works Department of the Provincial Government. Some 250 feet of the dam near the left bank bulk-head was removed because of its weakened condition. There was danger that the dam might give way during high water and cause serious damage to the bridges and the valley lands immediately below. It will be recalled that the Province constructed a large fishway in the race of the dam in 1903, and that all the salmon that have since entered the lake have passed through it. In doing so they were enumerated with some considerable degree of accuracy.

It was shown, for example, that over 4,000,000 sockeye passed through the fishway in 1909, that some 550,000 passed through it in 1913, and less than 28,000 in 1917. The removal of the section of the dam above referred to enabled the fish this year to enter the lake with ease and without passing through the fishway, though passage through the fishway was still available to them. It could not therefore be determined with any degree of accuracy how many entered the lake this year. A watchman was stationed there during the season as in the years since the fishway was constructed. His report states that sockeye first reached there on August 18th, and that small numbers were observed daily up to September 18th; that they were most numerous between September 1st and 10th, and that he believed the total number that entered the lake this year was greater than last year, but very much smaller than four years ago.

On visiting the Horsefly River, the main spawning tributary of Quesnel Lake, we were informed by men mining in the river-bed and by residents along the banks that more sockeye reached the Horsefly this year than last, but that the run was very small for a big year.

At the spawning-grounds at the head of Bowron Lake (called Bear Lake in my early reports), a tributary of the South Fork of the Fraser, very few sockeye were found. The run to this section in the big years up to 1913 was always large, and in the lean years up to 1909 considerable numbers were seen there. Observations by residents on the stream below Bowron Lake indicate that the sockeye were more numerous this year than last year and that the run of spring salmon was larger.

For the first time in several years it is reported that sockeye were seen in the tributaries of the Nechako River.

Sockeye reached the Chilcotin River on August 4th. The Indians, notwithstanding the existence of prohibitory regulations, are known to have taken a few at night for some two weeks after that date. Indians living at the head of the Chilko River near the outlet of Chilko Lake state that the run this year was greater than last season. From the statements made by Chilcotin Indians and resident whites, there is reason to believe that the run to that section this year was better than to any other section above Hell's Gate.

Not a single sockeye is known to have entered Seton Lake this year, though a close watch was maintained at the Seton Lake Hatchery and by residents on the Portage between Seton and Anderson Lakes.

The number of sockeye observed in the Shuswap Lake section was less than last season. None were seen in the Thompson and none made their appearance at the dam at the outlet of Adams Lake. Fishery Overseer Shotten, who has patrolled the Shuswap District and the Thompson River for the past eight years, reports that there were less sockeye this year than last, that no pinks were seen, and that the run of spring salmon was up to the average of recent years.

Superintendent T. W. Graham, of the Pemberton Hatchery at the head of Lillooet Lake, reported to Major Motherwell that the run of sockeye to that section this year was not as great as last year, but that it equalled those of 1908 and 1919, and was at least five times greater than in 1917, the year of the poorest run recorded there since the making of records was begun in 1902. Superintendent Graham collected 26,000,000 sockeye-eggs this year. The water in the river was high throughout the season, and owing to a break in the weir the egg collection was lessened by some millions of eggs.

Harrison Lake.—Alexander Robinson, Superintendent of the hatchery in the Harrison Lake District, reports that the run of sockeye this year was small to all waters in that section, the smallest since the hatchery was built in 1905. Sockeye-egg collections totalled but 700,000. There was a big run of pinks, but the run of springs was not as large as in recent years. Water conditions were most unfavourable for natural spawning.

Pitt Lake.—There was an average early run of sockeye to Pitt Lake and tributaries, but water conditions were most unfavourable for natural spawning and egg collections.

Cultus Lake.—Sockeye made their appearance at Cultus Lake in August, a month earlier than usual. Approximately 10,000 reached the spawning-station at the lake's entrance, the majority of which were spawned artificially. More than 4,000,000 sockeye-eggs were secured.

A summary of conditions of the spawning area of the Fraser basin this year shows that, notwithstanding the fact that 1921 was in the cycle of former big runs, the run of sockeye was no larger and the spawning-beds no better seeded than in recent lean years. The quadrennial big run of sockeye to the Fraser River has been destroyed.

There were not sufficient eggs deposited in the Fraser this year to produce an ordinary lean-year run.

The following statement forwarded to the Department by Major J. A. Motherwell, Chief Inspector of the Dominion Fisheries Department, gives the total egg collections of all the hatcheries:—

COLLECTION OF EGGS, BRITISH COLUMBIA, 1921.

Hatchery.	SALMON.					Totals.
	Sockeye.	Cohoe.	Humpback.	Spring.	White Spring.	
Anderson Lake	10,033,200	.....	.....	.....	.....	10,033,200
Babine Lake	6,090,000	.....	.....	.....	.....	6,090,000
Cowichan Lake	.....	1,227,800	.....	1,507,300	9,000	2,744,100
Cultus Lake	4,306,200	.....	.....	.....	.....	4,306,200
Harrison Lake	727,000	.....	4,515,000	937,000	.....	6,179,000
Kennedy Lake	1,854,000	82,950	.....	.....	.....	1,936,950
Pemberton	26,053,000	.....	.....	.....	.....	26,053,000
Pitt Lake	2,680,750	.....	.....	.....	.....	2,680,750
Rivers Inlet	18,374,400	.....	.....	.....	.....	18,374,400
Skeena River	4,286,000	4,000	396,000	.....	.....	4,686,000
Stuart Lake*	5,530,000	.....	.....	.....	.....	5,530,000
Totals	79,934,550	1,314,750	4,911,000	2,444,300	9,000	88,613,600

* Eggs collected from the Skeena River Basin.

Respectfully submitted.

JOHN PEASE BABCOCK,
Assistant to the Commissioner.

Victoria, B.C., December 1st, 1921.

THE SPAWNING-BEDS OF THE SKEENA RIVER.

Hon. William Sloan,
Commissioner of Fisheries, Victoria, B.C.

SIR,—In obedience to your instructions, I beg to submit herewith the following report on the spawning-beds of the Skeena River for the season 1921:—

I arrived at Donald's Landing, on Babine Lake, on the evening of September 6th, and on the following day proceeded to 15-Mile Creek, which is some 10 miles from the head of the lake on the south shore. This creek has about half a mile of ideal spawning-grounds commencing at the mouth of the creek and ending at the first little waterfall. Beyond that the creek is of a rocky nature, with a series of waterfalls, which hinder the sockeye from going up and is not suitable for spawning purposes. At the time of my visit there were fourteen Stuart Lake Indian families fishing with thirty nets off the mouth of the creek and had caught something like 4,000 sockeye. I met Mr. Crawford, the Superintendent of Stuart Lake Hatchery, and his assistant, Mr. Karnock, who were busy spawning. The barricade, or fence, for spawning purposes is erected at the head of the spawning area, which in no way interferes with the natural propagation in the creek. Mr. Crawford informed me he commenced spawning on August 29th, which is eleven days earlier than last year, and that he had then almost a million sockeye-eggs. This creek was in excellent shape and there would be at least three times as many sockeye as last year. The creek will be well seeded and will compare favourably with any former average year. The sockeye could be plainly seen spawning from the mouth of the creek right up to the barricade, and although there were quite a number of undersized fish, or "runts," as they are called, the average size on the whole was much better than last year. The females were in excess of the males in proportion of about ten to eight. I visited this creek again on September 17th and found the Indians had caught about 7,000 sockeye. I am informed that there have been at least twenty-four Indian families, all from Stuart Lake, fishing off the mouth of this creek this season. As this is quite a drain on this particular creek, I think some restrictions should be imposed, limiting at least the number of nets used at one time. I understand that it is owing to the fishing restrictions on the Fraser River watershed that the Stuart Lake Indians are now coming to Babine. Mr. Crawford had then secured 2,110,000 sockeye-eggs and he was hopeful of obtaining another 500,000 from this creek. One Indian who had his net out the night before had caught twenty-four green sockeye, all females too, which was evidence the sockeye were still running at this date. Mr. Crawford informed me it was his intention to plant 250,000 eyed sockeye-eggs in this creek when he was through spawning, and another 250,000 in Pierre Creek, another creek on Babine Lake from which he obtains ova for Stuart Lake Hatchery.

On September 9th I arrived at Pierre Lake, which is almost midway between the Old Fort and the head of the lake, and was agreeably surprised to find no Indian fishing at the mouth. This creek was also in good condition, having even a bigger spawning area than 15-Mile Creek. Mr. Crawford had his fish barricades erected away up the creek too, as this was of a similar formation to 15-Mile. Sockeye were seen in this creek on August 1st and Mr. Crawford commenced spawning on August 18th, which is five days earlier than last year. The number of sockeye-eggs Mr. Crawford had spawned in this creek was approximately 2,000,000. This creek was also well stocked with sockeye, large numbers even being seen in the lake at the mouth of the creek, some of which were spawning. The fish here were of a good size and were of a better average than 15-Mile, the males, if anything, predominating. From the number of fish seen and also the number that had already spawned by the formation of the gravel, this creek will be well seeded and up to the average of former years.

Leaving Pierre Creek, I arrived at the Babine Hatchery on the night of September 10th and met Mr. Gibbs, the Superintendent. The following day an inspection was made of the Hatchery Creek from the mouth to the outlet of Morrison Lake, where the hatchery is located, a distance of about 2½ miles. This creek is cleared of all obstructions and is a series of pools and gravel patches. Although the big majority of the sockeye spawn in the upper part of the creek, a large number were seen in the deep pools at the lower end and some were spawning in the shallow gravel patches. This creek is undoubtedly the best sockeye-creek on the Skeena watershed, and its success is mainly due to the hatchery and its location. Although it is not considered an early

spawning-creek, I was informed by Mr. Gibbs and his men that a large number of sockeye came up the creek and into Morrison Lake as early as June 18th. As the barricades and fish-pens were not erected till July 15th, it was evident from the number of dead sockeye in the creek at the head of Morrison Lake that an early run had occurred. Hatchery Creek was alive with sockeye, the big fish-pens being one swarming mass. The creek will be well seeded and easily up to the average of former years. The fish in this creek are of an exceptional quality and attain a high average, the males and females being evenly balanced. Two of the female sockeye picked at random measured 25½ and 26½ inches respectively, while I should think the average weight of the sockeye to be in the vicinity of 9 lb. Up to September 12th Mr. Gibbs had spawned 2,500,000 eggs, and judging by the sockeye still available he should not have much difficulty in obtaining his 8,000,000 capacity for the hatchery. I may say that Mr. Gibbs is having great success with his retaining-ponds, where this year's sockeye-fry are being held. The pond, or rather the series of ponds, have an intake of running water from Morrison Lake and there were in the neighbourhood of 5,000,000 fry. To look at the ponds in the evening one would imagine it was pouring rain, so swift were the young fry in catching the small flies that would alight. Although a keen search was made, I could only see two or three dead fry in the bottom of the ponds.

I arrived at Babine on September 13th and the following morning went down the Babine River for about 10 miles. It is on this stretch of water that the Babine Indians, approximately 100 families, catch their winter's supply of fish. Although this stretch of water from the bridge at Babine for a distance of at least 3 miles has always been considered a good spawning-ground, there were very few sockeye to be seen. There were large numbers of humpbacks, however, and a few cohoes, which was a decided contrast to the well-stocked sockeye-creeks in the lake. The Indians have their smoke-houses all down this stretch of water on both side of the river and complained bitterly about the scarcity of sockeye. Unlike the down-river Indians and their choice of salmon, the Babine Indians prefer sockeye and sockeye only. An examination of their smoke-houses revealed that the average catch per family would be less than 200 sockeye, with probably from 400 to 500 humpbacks and a few cohoe and spring salmon. This stretch of water will be poorly seeded and away below the average of former years.

Leaving Babine on September 14th, I arrived at Tachek or Fulton Creek, where there were seven Indian families fishing off the mouth. The Indians had a fair amount of sockeye in their smoke-houses, but complained about not catching enough through their rotten nets. The Dominion Department furnishes each family with a new net each year, but it appears they keep using their old nets as well, with the result stated. This creek resembles a slough for about a mile from the lake and has about 3 miles of fair spawning-grounds. The sockeye go up as far as the falls, about 4 miles from the lake, but cannot get beyond. This creek was also in good condition, with a large number of sockeye in the pools and many spawning in the shallow gravel patches. The sockeye were of a good size, with the males slightly in excess of the females. This creek will be exceptionally well seeded and will rank next to Hatchery Creek, being well up to the average of former years. Last year this creek was almost devoid of sockeye.

I visited Beaver Creek on September 17th, which is a much longer creek than the others. This also has a slough for about 3 miles from the lake, with a series of rock and log obstructions and a few good spawning areas for about 9 miles up the creek. This creek is the farthest from the mouth of the Babine Lake and also the earliest spawning-creek. I am informed there was a big run of sockeye up this creek on July 30th, and that it has never been so good for years. I went up the creek for a considerable distance, but there were few live sockeye. It was well seeded, however, judging from the big number of dead salmon caught in the log-jams and in the big pools. The Indians speak well of this creek too and are very enthusiastic about it, as they say that lots of sockeye in creek means lots of bear.

Leaving Beaver Creek, I called in at 4-Mile Creek, but this is too small to be of any importance, as one can jump across it almost anywhere. There were, however, a few live and some dead sockeye which had spawned. As this was the last point of interest on Babine, I returned to Donald's Landing and arrived at Burns Lake on September 18th. In summing up the Babine District, I may say that, with the exception of Lower Babine River, which will be poorly seeded, all the creeks on the lake, the more important spawning-grounds, will be well seeded, very much better than last year and will compare favourably with any former average year. It was plainly evident that the run was much earlier than previous years; hence the

poor catch of sockeye from the hundred Indian families on Babine River. There were also, I may say, more fish with net-scars than former years.

While at Burns Lake I was informed by the Indians that there was a run of sockeye in Burns Lake from the Fraser River for the first time for eighteen years. Mr. Crawford also said the same occurred in Stuart Lake, of the Fraser River watershed.

I arrived at Hazelton on September 20th and visited Awillgate Canyon, in the Bulkley River, where the Hazelton Indians catch their fish. The Indians had removed a lot of the fish from the smoke-houses, but the Dominion Guardians informed me that the Indians must have put up at least 10,000 sockeye. According to the Guardians' report, there was a good run of sockeye up the Bulkley River and the Indians were apparently quite satisfied with the amount they had caught. The Kispiox River and creeks in the Hazelton vicinity were swarming with humpbacks and there has also been a good run of cohoes.

Leaving Hazelton, I arrived at Terrace on September 22nd and visited Lakelse Lake and hatchery the following morning, when I met Mr. Catt, the Superintendent of the hatchery. Mr. Catt informed me that the sockeye run to the lake was very poor this year and that he only had obtained to date a total of 3,800,000 sockeye-eggs for the hatchery. The first sockeye, he informed me, were seen in the creeks on June 12th, and the barricades, or spawning-fences, were not put in till July 24th, so a few sockeye would undoubtedly spawn naturally up the creeks. Mr. Catt commenced spawning on August 5th and he said there were more ripe fish then than the first day's spawn last year, which again bears out the theory of an earlier run this year. The first creek visited was Williams Creek, which is a long, swift-running creek opening out near the mouth. The sockeye do not go far up, preferring to spawn in the shallow gravel-beds near the lake. There were not many sockeye in the creek, but the fish-pens at the barricade were full and contained a good number of green or unripe sockeye. A number could be seen in the lake at the mouth of the creek, so apparently the sockeye were still running. This creek will be poorly seeded and will be below the average of former years.

Schallabuchan was the next creek visited, but as this is a much earlier spawning-creek there were few live sockeye to be seen. From the number of dead salmon in the creek it is apparent that a few had gone up and spawned, but the average was away below normal.

The remaining creeks were much smaller, but the same poor condition existed, which forecasts that the Lakelse area will be poorly seeded this year and will be away below the average of former years. All the creeks on Lakelse are of a mountainous nature, and Mr. Catt attributes the failure this year to the excessive high water in these mountain streams in the fall of the year 1917, when most of the natural spawned ova was washed away. As this was the last point of interest, I returned to Terrace and arrived in Port Essington on September 25th.

I wish to express my thanks and appreciation to the Dominion Hatchery Superintendents and the Dominion Fishery Guardians, to whom I am indebted for information supplied and hospitality shown.

I have, etc.,

ROBERT GIBSON,

Provincial Constable and Fishery Overseer.

Port Essington, B.C., October 5th, 1921.

THE SPAWNING-BEDS OF THE NASS RIVER.

Hon. Wm. Sloan,
Commissioner of Fisheries, Victoria, B.C.

SIR,—In obedience to the wishes of the Department, I have made a trip of inspection to the salmon-spawning area of the Meziadin watershed of the Nass River, and beg to submit the following report:—

Before leaving for the north I made arrangements with the Chief Inspector of Dominion Fisheries, J. A. Motherwell, to make the trip into the Nass in company with their Overseer, J. M. Collison. I left New Westminster on September 8th and arrived at Prince Rupert on the 10th, where I met Mr. Collison. We engaged three Indian packers for the trip. We arrived at Stewart on the 11th and after getting our outfit together left for the interior on the 13th.

On the trip in we encountered many difficulties on account of the bad condition of the trails, also in crossing the Bear River Glacier. The ice, which is receding in many places, makes travelling very dangerous. There being no bridge or other means of crossing the Surprise River, it is necessary to ford it. This is a mountain stream about 200 feet wide and the water is waist-high. A cable crossing at this place would be of great benefit to travellers, as the waters rise very rapidly during freshet and it is very dangerous to ford when you have a heavy pack on your back.

We reached the head of Meziadin Lake on Saturday, September 17th, in a pouring rain and everything wet through.

On Sunday, September 18th, we made an inspection of the spawning-beds at the south-west section of the lake, from the head of the lake and for a distance of 3 miles down. Sockeye were to be seen at different favourable places for spawning and at one place they were fairly plentiful. On the 19th we left the head of the lake and followed the north-westerly shore-line on our journey down. For a distance of between 3½ or 4 miles there are several favourable shallow gravel reaches suitable for spawning sockeye, and at these places sockeye were to be observed in considerable numbers and far more numerous than I have seen at this place before. Here we saw a grizzly bear wade into the lake and take two salmon.

On continuing our journey down the lake we went up Hanna Creek and McLeod Creek, two streams of considerable size, emptying into the lake on its northerly side. We only saw one sockeye there. The water, which is very clear, enables you to see the bottom, and my observations bear out my previous contention that sockeye do not go up these streams for spawning purposes.

There were very few salmon to be seen leaping in the lake, which is their habit when they enter the lake green, or, rather, when they are not nearly ripe for spawning.

At the spring-salmon spawning-ground below the McBride Rapids in the Meziadin River there were not so many springs to be seen as in former years. After inspecting the vicinity of the rapids we continued our way on down the river and arrived at the cabin at the fishway after dark. It was raining hard.

On Tuesday, September 20th, it poured with rain all day and we were unable to make any inspection worthy of note.

On the 21st, the rain having ceased, we made a thorough inspection of both the upper and lower falls from all angles. There were very few salmon at either place. Two small schools were to be seen immediately below the upper fall and a small number on the far side, not more than twenty-five in each lot. They were about half sockeye and half cohoe. No salmon were to be seen congregated below the lower fall, but a few salmon were passing up at intervals, mostly cohoe.

Very few salmon were passing through the fishway, only an odd one once in a while, and only a small number resting in the basins of the fishway. The reason for this is that there were no fish to come through. The salmon passing up were sockeye and cohoe, and the cohoe were in greater numbers.

The absence of sockeye at the fishway was very noticeable to one whose duty it has been to make an annual inspection, for in the past, up to and including the year 1917, as many sockeye could be observed passing through the fishway in one minute as we saw this season

pass through in one hour. It must be borne in mind that I have always timed my inspection at this point to take place between September 20th and 28th. The stage of water at the falls and fishway was favourable for the salmon to pass up.

In the evening of the 22nd and morning of the 23rd there were more cohoe salmon coming in, but no improvement in the sockeye run. On the 22nd we inspected the main Nass River from its junction with the Meziadin and for 1 mile above. A few salmon were to be seen passing up the Nass to watersheds above the Meziadin, but conditions for making observations at this point are not good owing to the discoloration of the water and its great volume.

The conditions at the fishway and approach to it are practically the same as reported upon during my visit of inspection last season. The braces that were put in to hold up the crib-work are all intact and look good for another year, unless some unforeseen trouble comes along, such as a flood or freshet like that which visited the Upper Nass District in the late fall of 1917. The basins of the fishway are gradually filling up, the debris being nearly up to the top of the facing-wall and for about half of the depth of each basin, leaving very little resting-place at the present time. All of these basins will have to be cleaned out in the near future. It can best be done by placing a dam across the intake. The work will have to be done at the lowest stage of water, which I think would be in the early spring before the snow and ice start to melt.

Summary.—In comparing the run of sockeye salmon to the Meziadin watershed for 1921 with former years, I am of the opinion that there were more sockeye to be observed on the spawning-beds in the lake and a slight decrease at the falls in comparison with the years 1919 and 1920. The run of spring salmon was not as good and the cohoe appeared to be more plentiful.

All my previous trips of inspection were timed so that I would be at the Meziadin Falls about the same date each year, and from the time of my first visit in 1908 up to and including the year 1917 there were always a large number of sockeye to be observed at this place. This happy state of affairs has ceased to exist, and at times it is now only possible for an experienced eye to detect salmon lying below the falls. It will be noted that no inspection was made in the year 1918, but the work was carried on in 1919, 1920, and 1921. From the reports of these three years it is shown that the runs of sockeye to the Meziadin watershed have materially diminished.

In making a report on the sockeye situation of the Lower Nass River, with the exception of a small unimportant stream close to Ayansh, all of our data have been taken from the Meziadin watershed. While I think that the Meziadin watershed is the most important as far as the run of sockeye to the Nass is concerned, we have it on record that the sockeye still continue on up the main Nass River above the Meziadin, and have been seen in Bowser Lake. Owing to the shortage of provisions and the inclemency of the weather at the time of my visit to Bowser Lake it was not possible to make more than a survey of the lake, and to substantiate the fact that sockeye did run to this watershed I have been informed that there is a river entering the main Nass from the east side, and above the Bowser Lake watershed, that sockeye run to. We have no data from this source and we do not know what bearing the streams above the Meziadin have on the sockeye situation of the Nass. The country around the Upper Nass is very difficult to travel, there being several large rivers to cross and no means of crossing otherwise than by raft, and then only in favourable places. Many parties travelling in this district have nearly met disaster.

Yours obediently,

C. P. HICKMAN,

Inspector of Fisheries.

New Westminster, B.C., November 21st, 1921.

THE SPAWNING-BEDS OF SMITH INLET.

Hon. Wm. Sloan,
Commissioner of Fisheries, Victoria, B.C.

SIR,—In pursuance of instructions from the Department to conduct an inspection of the spawning-beds at Smith and Rivers Inlet respectively, the watershed at Smith Inlet was visited first.

The exceptionally poor run of sockeye salmon manifest in the small pack obtained by the canneries during the fishing season, totalling, I am reliably informed, to but a little over 4,000 cases, clearly demonstrated the merit of the warning given in my reports for 1916–17, two years from which the present run resulted, that if the intensive fishing to which this inlet has been subjected yearly was repeated disastrous effects would result. The conditions were serious on the spawning-beds this year, as the following detailed report will show:—

Leaving Rivers Inlet Cannery on September 18th, I proceeded to Smith Inlet, and after making arrangements with Indians conducted an inspection at Long Lake, the breeding-grounds of the sockeye salmon.

The Docee river (the overflow of the lake) was negotiated with little difficulty and camp made at this point. The number of spring salmon noted in this river showed no falling-off from other years, large numbers being in evidence all the way up. The water was too high to estimate the number spawning on the gravel shore at the foot of the lake, but the continual breaking of water indicated a good run.

Proceeding to Quay Creek, a distance of about 7 miles, an examination was made of the spawning-beds both inside and outside the creek, but the small numbers disclosed conclusively demonstrated that little value can be attached to the supply of eggs deposited this year. The run to this stream was a failure.

On reaching the head of the lake, a distance of 16 miles, two or three schools of sockeye salmon were observed schooled in the still waters of the lake close to the entrance of Geluch River, or Smoke-house Creek, as it is termed by the Indians, and on the spawning-beds inside the entrance. Hope was entertained that the run here would be a considerable improvement on that reflected in the run of fish to Quay, but the spawning-beds disclosed few sockeye as we proceeded up to the falls 3½ miles distant. The small mountain streams emptying into this tributary contained a few sockeye, but in comparison with other years the poor showing of fish both here and in the main river was distinctly disappointing. The run, in my opinion, is the poorest since 1916. The fish generally were small in size. No log-jams or other obstructions interfered with the free movement of salmon up-stream.

An inspection of the Delabah River, situated about 2 miles from the head of the lake, was conducted under ideal conditions. From the entrance up for a distance of 500 yards the spawning-beds contained no evidence of sockeye salmon, in striking contrast to the scene represented last year, when in this part of the stream thousands of fish had collected; farther up, however, sockeye were seen in large numbers, the first real showing of fish found on the beds. In the bay outside, where in former years big schools of sockeye were observed, none were to be found. The run to the head of the lake did not approach even the small number seen here in 1916.

Usually salmon are seen breaking water in all directions on the lake when travelling up and down, but this season none were in evidence.

Reviewing the conditions of the spawning-beds at Smith Inlet this year, I am obliged once more to emphasize the danger of intensive fishing. The effects of the use of drag-seines operated in 1916–17 was manifested in no uncertain manner by the poor run of sockeye to the inlet this year. Now, although the seines have been eliminated, it is vital to the interests of those concerned to conserve the runs, especially during the next two years, in order to allow the spawning-beds to recover from the depletion which is all too apparent. The outlook is not encouraging in this respect, as it is to be noted that the cannery interests, instead of nursing the runs, are increasing their gear to such an extent that no less than 218 gill-nets were distributed over the inlet this season. Such a policy if continued cannot but have a devastating effect upon the runs in future years, as the runs will not stand the drain and will assuredly become extinct if present conditions are continued. In size the sockeye were much below the average.

I have, etc.,

A. W. STONE,
Fisheries Overseer.

Rivers Inlet, B.C., November 1st, 1921.

THE SPAWNING-BEDS OF RIVERS INLET.

Hon. Wm. Sloan,
Commissioner of Fisheries, Victoria, B.C.

SIR,—I have the honour to submit my report upon the inspection of the Rivers Inlet watershed for the year 1921.

Having completed the inspection of the spawning-beds at Smith Inlet, where conditions were found to be anything but satisfactory, it was with a feeling of misgiving that the spawning-beds at Lake Owikeno were approached, especially considering the small pack of sockeye salmon obtained by the canneries during the fishing season, amounting to about 45,000 cases.

Leaving for the lake on October 4th, I stayed overnight at the Dominion Hatchery and was able to view, by the courtesy of Weldon R. Reid, the officer in charge, the new ponds which have been built under the direction of Mr. McHugh, Engineer for the Department of Dominion Fisheries, for retaining the young fry until the yearling stage. The advantage which will be derived from this system is manifest, as it means that the young fish when liberated will be in a much stronger state to withstand the numberless enemies met with on their migration to the sea. It entails a great deal of extra work, as the young fry have to be fed; this is being performed by the use of cheap-grade salmon, and also by making use of the spawned-out sockeye, which are collected from the spawning-beds and dried in a special drying-kiln erected for the purpose. It is an entirely new departure upon which the Dominion authorities have to be commended, and is an earnest of their desire to keep the supply of sockeye salmon at Rivers Inlet up to its full productive power.

Taking advantage of the fine weather, I first made an inspection of the Sheemahant River, situated about 30 miles up the lake. It is an arduous trip at any time, but difficult and dangerous when the river is not just right for canoeing. On this occasion we were able to reach to within half a mile of the falls by canoe. It was very disappointing to note the utter lack of spawning sockeye on the beds as we made our way through the innumerable rapids to the falls 18 miles distant. At a small creek entering this tributary 12 miles from the mouth, and which in former years never failed to contain sockeye, no fish of any description were noted. Our first view of the sockeye salmon was obtained at the falls, where numbers were making futile efforts to surmount them, but were hurled back at each attempt. A careful examination was made of the rock-slide which for a distance of about 300 yards obstructs the flow of water from above. The first obstruction is composed of two huge rocks flung across the river, with about 10 feet dividing them. It is through this narrow passage the torrent of water hurls itself, forming an insurmountable barrier. Above this other large rocks have decreased the original width of the river to such an extent that the easy flow of the water above is now turned into a seething torrent. With comparatively little expense at the proper time the rocks could be blasted out and the salmon given access to about 20 miles of the fine spawning-grounds. It is encouraging to learn that the Dominion Department of Fisheries is directing its attention to this rock-slide and that in the near future it is to be removed. The same care was exercised in examining the river on our return, but there was no evidence of either sockeye or cohoe salmon. There were two obstructions in the river, one about 5 miles up and the other a little farther along from this; both should receive attention.

Arriving at the head of the lake, camp was made and an inspection conducted at the tributaries situated here. The Cheo, examined first, was very disappointing, no evidence of sockeye being noted, with the exception of about fifty seen in a small creek 3 miles up. The log-jam at the bend and situated just below the falls still obstructs the river, but proves no hindrance to the salmon reaching the spawning-beds between this and the falls. No salmon were noted here, which is in striking contrast to the well-stocked beds reported last year.

The Indian River failed to show any sign of fish, which may have been due to the freshet earlier in the spawning season, but the absence of the dead salmon usually seen here, in my opinion, points clearly to a very poor run.

The Washwash River, situated directly opposite the lake, was fairly well supplied with spawning sockeye, but in comparison with last year very much below the average. In that portion of the river situated between the log-jam and the entrance not one salmon was observed

on the spawning-beds, the run closely resembling the poor showing encountered in 1916. A great deal of work is necessary to clear out the mass of debris and log-jams which have accumulated once more in that part of the river which a few years ago received attention from the Department of Dominion Fisheries, and will again become a source of danger if not taken in hand shortly. The new channel formed two years ago, and to which reference has already been made, is still covered with fallen trees and log-jams.

Returning from the head of the lake, I examined Sunday Creek and was glad to see an improvement in the run of fish here. The spawning-beds lying along the shore-line at the mouth were thickly covered, closely resembling the number which returned to spawn in 1917.

The spawning-grounds situated near the Sheemahant flats were well covered with both cohoe and sockeye salmon, providing the Indians located here with all the fish necessary for their winter's use. At the landing close to the Indian shack thousands upon thousands of yearling salmon were seen in the clear water feeding upon the offal of dead salmon. They were undoubtedly the results of last year's spawning.

Jeneesee Creek, from which the Dominion Hatchery has annually taken eggs, unlike the conditions experienced in recent years, showed up remarkably well. The retaining-fence which had been carried out by a freshet earlier in the season permitted thousands of sockeye to reach the spawning-beds above. The hatchery officials had made little progress in collecting eggs owing to the large number that had escaped, but were not worrying on this account, as there still remained sufficient sockeye available for their requirements. From the entrance up to the fence the creek was alive with fish, decidedly the best showing here since 1913. The Indians had placed a net right across the mouth and determined action on the part of hatchery people was necessary in order to put a stop to their depredations. Mr. Reid wasted no time in argument, but had the net pulled up by his men, threatening to take other action if they employed similar methods in future. I understand it is the intention of the Department of Dominion Fisheries to build a retaining-pond in this creek in order to hold the young fry until the yearling stage, similar to the method employed at the hatchery.

A visit to the Machmell River was next undertaken, but owing to the high stage of the water it was impossible to form any estimate of the number of salmon on the spawning-beds here. In order to prevent this river overflowing into Jeneesee Creek as it did last year a new channel has been blown out on the extreme right. It is hoped by these measures that a great body of water will be turned away, relieving the strain on the dam which, under the direction of Mr. Reid, of the Dominion Hatchery, was hurriedly constructed at the time the Machmell broke through into Jeneesee Creek. Great ingenuity was displayed by Mr. Reid in meeting the emergency at the time of its occurrence.

The Nookins River, a tributary to the Machmell, was examined under the most favourable circumstances. For the first time in many years it was possible to go right through to the big rapids several miles up by canoe. I was disappointed at the run of sockeye here, the spawning-beds disclosing a great scarcity of fish, reminding me of the small number that reached there in 1916.

Asklum River, situated about 12 miles from the mouth of the Owikeno Lake, experienced an exceptional run of sockeye salmon this year. The run closely coincided with the remarkable numbers observed on the spawning-beds in 1913–14. The hatcherymen had erected two fences about a quarter of a mile from the entrance and, although meeting with constant difficulties, succeeded in obtaining a fair number of eggs. The river-bed up to the fences was literally covered with spawning fish, while in the deeper portion of the river thousands waited. Above the fences sockeye in equal numbers to those seen below were noted.

The Indians outside this stream were catching fish by means of a net. They had experienced no difficulty all the season in obtaining all they required for smoking purposes. Large numbers were in evidence in the lake near the mouth of the stream.

At the Dominion Hatchery, situated on Quap River, there was a scene of great activity. The men had their hands full in collecting eggs. The traps were full of fish and a seething mass lined the spawning-beds below the fence. From there down to the entrance thousands upon thousands of sockeye were making their way up-stream or waiting in the deep pools. Out in the bay the water was black with them, corresponding very closely to the remarkable numbers seen here last year, and even this number did not represent the total run to this river this year, as I was later informed that after my visit another big run had come in. Beyond the fence only

those fish that had artificially been spawned out were in evidence. With the opening of the fences after the requirements of the hatchery have been filled, the spawning-beds, now clear of all obstructions, should be exceptionally well seeded.

The Dalley River, situated directly opposite, bore unusual evidence of a fine run of fish; distributed over the river-bed numberless dead bodies could be seen in the clear water below the rapids, testifying to a big run earlier in the season. Large numbers were observed spawning on the beds all the way up to the falls about 4 miles distant, and in my opinion equalled the numbers seen there in 1917. No log-jams or other obstructions interfered with the free movement of the salmon up-stream.

Returning to the hatchery once more, the small creek, which on my former visit contained very few sockeye, now showed up to great advantage. The beds were thickly covered with spawning fish, and it was hoped that a fair number of eggs would be collected by means of the trap located at the entrance. It was the intention of Mr. Reid to fill the hatchery with 18,000,000 eggs if possible, a greater number than it had ever received before. To prevent the danger of such a large number becoming smothered at the time of hatching, it is proposed to thin them out immediately and place them in the retaining ponds recently built for the purpose.

Sockeye were much in evidence spawning on the gravel-beds situated along the shore-line close to the rancherie. Spring salmon also showed up in numbers here and should provide a fair run of this species on their return as adults. Both cohoe and chum salmon failed to appear in large numbers this year, the run of each species showing up very poorly.

In summarizing the general conditions of the spawning-beds at Rivers Inlet, I find that the rivers situated at the head of the lake, comprising the Indian, Cheo, and Washwash, were anything but satisfactory. The recent freshet may have accounted partly for the poor showing made here, but all the evidence points to a very poor run of sockeye, as was the case in 1916–17. The Sheemahant and Nookins Rivers were both poorly seeded in those years. The other tributaries of the lake, comprising the Asklum, Jeneesee, Quap, Dalley, and the spawning-beds of the lake-shore, were, on the other hand, as well seeded as in recent years. The size of the sockeye observed in all the tributaries closely coincided with the bi-weekly tests made by me at the canneries during the fishing season. They averaged but little over 5 lb. each. That may be the reason why more fish were not caught in the great amount of gear employed.

In conclusion, I wish to extend my thanks to C. C. Johnston, Manager of Rivers Inlet Cannery; Weldon R. Reid, officer in charge at the Dominion Hatchery, and to his assistants for the courtesy received at their hands.

I have, etc.,

A. W. STONE,

Fisheries Overseer.

Rivers Inlet, B.C., November 1st, 1921.

PACK OF BRITISH COLUMBIA SALMON, SEASON 1921.

COMPILED FROM DATA FURNISHED THE DEPARTMENT BY THE B.C. SALMON CANNERS' ASSOCIATION.

Names.	Sockeyes.	Red Springs.	Pink and White Springs.	Bluebacks and Steelheads.	Cohoes.	Pinks.	Chums.	GRAND TOTAL (Cases).
FRASER RIVER DISTRICT—								
B.C. Fishing & Packing Co., Ltd...	16,922	4,663	5,235	845	12,018	2,739	2,355	44,777
J. H. Todd & Sons, Ltd.	2,196	3	.....	66	4,792	439	1,043	8,539
A.B.C. Packing Co., Ltd.....	2,255	546	471	.....	100	1,640	.....	5,012
Gosse-Millerd, Ltd.	2,631	529	36	.....	108	559	.....	3,863
Great West Packing Co., Ltd.. ...	1,903	1,178	.....	.....	4,200	.....	62	7,343
Glenrose Canning Co., Ltd.....	3,969	2,127	199	.....	5,149	.....	.....	11 444
Canadian Fishing Co., Ltd.....	2,125	.....	.....	.....	2,653	2,219	7,763	14,760
Great Northern Packing Co., Ltd...	1,483	1,694	.....	.....	422	549	.....	4,148
M. DesBrisay & Co.....	827	150	4	.....	277	33	.....	1,291
A. H. Sherman, Ltd..	1,589	470	4	420	259	.....	.....	2,742
J. H. Todd & Sons (Esquimalt)....	2,754	.....	.....	.....	.....	....	.....	2,754
Sooke Harbour Fg. & Pk. Co., Ltd..	977	.....	.....	.....	.....	.....	.....	977
Totals.....	39,631	11,360	5,949	1,331	29,978	8,178	11,223	107,650
SKEENA RIVER DISTRICT—								
B.C. Fishing & Packing Co., Ltd...	4,680	7,699	201	229	13,003	29,449	466	55,727
J. H. Todd & Sons, Ltd.....	6,233	620	.....	.....	11,462	7,729	.....	26,044
A.B.C. Packing Co., Ltd.....	4,177	2,895	821	18	12,626	13,719	237	34,492
Gosse-Millerd, Ltd.....	3,706	380	29	155	1,182	9,890	31	15,373
B.C. Canning Co., Ltd.....	3,635	304	.....	.....	605	12,393	.....	16,937
Kildala Packing Co., Ltd.....	2,241	1,001	210	96	519	12,276	84	16,427
Northern B.C. Fisheries.....	2,698	1,443	477	.....	973	6,401	.....	11,992
Cassiar Packing Co., Ltd.....	2,043	872	.....	....	694	6,866	.....	10,475
Wallace Fisheries, Ltd.....	5,829	1,324	.....	.....	836	10,515	.....	18,504
Can. Fish & Cold Storage Co , Ltd.	4,223	1,657	1,060	.....	2,902	11,164	1,175	22,181
Maritime Fisheries, Ltd.....	1,553	404	369	.....	231	4,055	.....	6,612
Totals.....	41,018	18,599	3,167	498	45,033	124,457	1,993	234,765
RIVERS INLET DISTRICT—								
B.C. Fishing & Packing Co., Ltd....	11,880	110	.....	.....	2,997	233	155	15,375
J. H. Todd & Sons, Ltd.....	4,697	.....	.....	.....	172	247	.....	5,116
Provincial Canning Co., Ltd.....	5,603	.....	.....	.....	1,429	4,809	18	11,859
Anglo B.C. Packing Co., Ltd.....	3,547	25	.....	.....	43	12	.....	3,627
Gosse-Millerd, Ltd..... ...	4,352	45	.....	.....	.....	.....	.....	4,397
B.C. Canning Co., Ltd.....	5,419	48	.....	.....	6	.....	.....	5,473
Kildala Packing Co., Ltd.....	5,593	85	.....	97	12	.....	.....	5,787
Wallace Fisheries, Ltd.....	5,135	51	.....	.....	59	4	.....	5,249
Northern Fisheries (Namu)..... ...	2,389	.. ...	.....	.....	.....	.....	.....	2,389
Totals..... ..	48,615	364	.....	97	4,718	5,305	173	59,272
NASS RIVER DISTRICT—								
B.C. Fishing & Packing Co., Ltd...	1,975	725	252	238	3,257	5,329	567	12,343
Anglo B.C. Packing Co., Ltd.....	2,370	79	64	46	502	4,857	.....	7,918
M. DesBrisay & Co.....	1,789	58	.....	.....	1,676	10,062	1,005	14,590
Northern B.C. Fisheries, Ltd..... ..	1,974	327	53	129	2,236	3,559	27	8,305
Western Salmon Packing Co., Ltd..	1,256	242	288	.....	505	5,681	577	8,609
Totals..... .	9,364	1,431	657	413	8,236	29,488	2,176	51,765
VANCOUVER ISLAND DISTRICT—								
B.C. Fishing & Packing Co., Ltd....	3,501	.....	.....	7	3,285	1,593	4,350	12,736
J. H. Todd & Sons, Ltd.	.....	155	164	.....	5,903	4,633	1,172	12,027
Nootka Packing Co., Ltd.....	136	2,350	376	.....	592	.....	8,820	12,274
Clayoquot Sound Canning Co., Ltd.	1,174	102	.....	.....	781	.....	1,702	3,759
Quathiaski Canning Co., Ltd.....	2,100	83	.....	3,144	388	4,434	241	10,390
Wallace Fisheries, Ltd.....	25	.....	.....	.....	61	.....	4,171	4,257
Gosse-Millerd, Ltd.....	.....	.....	.....	.....	50	.....	3,402	3,452
Lummi Bay Packing Co., Ltd.....	.....	.....	.....	.....	60	.....	10,573	10,633
Totals.....	6,936	2,690	540	3,151	11,120	10,660	34,431	69,528
OUTLYING DISTRICTS—								
B.C. Fishing & Packing Co., Ltd....	4,654	318	2,452	3	9,584	3,030	5,295	25,336
Gosse-Millerd, Ltd.....	2,776	219	....	45	2,908	7,217	15,854	29,019
Northern B.C. Fisheries, Ltd.....	3,871	1,215	183	156	1,955	4,464	263	12,197
Western Packers, Ltd.....	3,429	42	44	.....	66	31	.....	3,612
Sea Fish Co., Ltd.....	69	.....	.....	2,586	426	76	.....	3,157
Wm. Hickey & Sons, Ltd.....	2,215	487	35	.....	3,264	.....	.....	6,001
Wallace Fisheries, Smith Inlet.....	1,336	.....	.....	.....	.....	.....	.....	1,336
Totals.	18,350	2,281	2,714	2,790	18,203	14,818	21,412	80,568
Grand totals.....	163,914	33,725	13,027	8,280	117,288	192,906	71,408	603,548

STATEMENTS SHOWING THE SALMON-PACK OF THE PROVINCE, BY DISTRICTS AND SPECIES, FROM 1906 TO 1921, INCLUSIVE.

FRASER RIVER.

	1921.	1920.	1919.	1918.	1917.	1916.	1915.	1914.	1913.	1912.	1911.	1910.	1909.	1908.	1907.	1906.
Sockeyes	39,631	48,399	38,854	19,697	148,164	32,146	91,130	198,183	719,796	123,879	58,487	150,432	585,435	74,574	59,815	183,007
Springs, Red	11,360	10,691	14,519	15,192	10,197	17,673	23,228	11,209	3,573	15,856	7,028	1,018	1,428	1,903	3,448	7,523
Springs, White	5,949	4,432	4,296	24,853	18,916	11,430	5,392	15,300	49	9,826	6,751	8,925	.....	2,263	557	.....
Chums	11,233	23,884	15,718	86,215	59,973	30,934	18,919	74,826	22,220	12,997	47,237	52,460	} 8,687	415	63,530	15,543
Pinks	8,178	12,839	39,363	18,388	134,442	840	138,305	6,272	20,773	574	142,101	128				
Cohoes	29,978	22,934	39,253	40,111	25,895	31,330	43,514	43,504	16,018	36,190	39,740	35,031	27,919	33,270	35,766	34,413
Steelhead Trout	8	34	328	4,395	4,951	3,129	31	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bluebacks	1,323	4,488	15,613	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Totals	107,650	136,661	167,944	208,857	402,538	127,472	320,519	349,294	782,429	199,322	301,344	247,994	623,469	112,425	163,116	240,486

SKEENA RIVER.

Sockeyes	41,018	89,364	184,945	123,322	65,760	60,293	116,533	130,166	52,927	92,498	131,066	187,246	87,901	139,846	108,413	86,384
Springs	21,766	37,403	25,941	22,931	16,285	20,933	15,273	11,740	26,436	23,833	17,942	9,785	12,469	13,842	10,378	20,138
Chums	1,993	3,834	31,457	22,573	21,516	17,121	5,769	8,329	.....	504	70	.....	} 28,120	45,404	25,217	38,991
Pinks	124,457	177,679	117,303	161,727	148,319	73,029	107,578	71,021	66,045	97,588	81,956	13,473				
Cohoes	45,033	18,068	36,559	38,759	38,456	47,409	32,190	16,378	18,647	39,835	23,376	11,531	12,249	10,085	15,247	16,897
Steelhead Trout	498	1,218	2,672	4,994	1,883	3,743	1,798	.....	.....	.....	.....	.....	.....	.....	.....	.....
Totals	234,765	332,887	398,877	374,306	292,219	223,158	279,161	237,634	164,055	254,258	254,410	222,035	140,739	209,177	159,255	162,420

RIVERS INLET.

Sockeyes	48,615	125,742	56,258	53,401	61,195	44,936	130,355	89,890	61,745	112,884	88,763	126,921	89,027	64,652	87,874	122,631
Springs	364	1,793	1,442	1,409	817	1,422	1,022	566	594	1,149	317	383	587	454	450	181
Chums	173	1,226	7,089	6,729	16,101	20,144	5,387	5,023	. ...	3,845	288	... .	.....	.....	.....	.....
Pinks	5,303	25,647	6,538	29,542	8,065	3,567	2,964	5,784	2,097	8,809	5,411	19	.....	479	700	.....
Cohoes	4,718	2,908	9,038	12,074	9,124	15,314	7,115	7,789	3,660	11,010	6,287	2,075	1,400	9,505	5,040	66
Steelhead Trout	97	.....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Totals	59,272	133,248	80,367	103,155	95,302	85,383	146,838	109,052	68,096	137,697	101,066	129,398	91,014	75,090	94,064	122,878

NASS RIVER.

Sockeyes	9,364	16,740	28,259	21,816	22,188	31,411	39,349	31,327	23,574	36,037	37,327	30,810	28,246	27,584	17,813	22,166
Springs	2,088	4,857	3,574	4,152	4,496	3,845	3,701	3,385	3,151	6,936	3,759	1,239	2,337	3,263	1,288	921
Chums	2,176	12,145	24,041	40,368	24,938	11,200	11,076	25,569	2,987	3,245	5,189	351	3,589	. ....	.....	.....
Pinks	29,488	43,151	29,949	59,206	44,568	59,593	34,879	25,333	20,539	12,476	11,467	895	.....	6,612	5,957	3,450
Cohoes	8,236	3,700	10,900	17,061	22,180	19,139	15,171	9,276	3,172	12,468	7,942	6,285	6,818	8,348	6,093	5,997
Steelhead Trout	413	560	789	1,305	1,125	1,498	113	.....	....	.....	.....	140	.....	1,101	681	.....
Totals	51,765	81,153	97,512	143,908	119,495	126,686	104,289	94,890	53,423	71,162	65,684	39,720	40,990	46,908	31,832	32,534

VANCOUVER ISLAND DISTRICTS.*

	1921.	1920.	1919.	1918.
Sockeyes	6,936	6,987	6,452	6,143
Springs	3,230	29,211	36,013	29,324
Chums	34,431	12,591	128,013	251,266
Pinks	10,660	14,391	43,186	57,035
Cohoes	11,120	20,555	53,629	40,752
Bluebacks	3,151	.....	.....	.....
Totals	69,528	74,170	267,293	389,815

OUTLYING DISTRICTS.

	1921.	1920.	1919.	1918.	1917.	1916.	1915.	1914.	1913.	1912.	1911.	1910.	1909.	1908.	1907.	1906.
Sockeyes	18,350	64,473	54,677	51,980	32,902	45,373	98,600	87,130	149,336	79,464	67,866	70,506	49,832	48,367	40,159	45,481
Springs	4,995	15,633	14,766	8,582	6,056	11,423	9,488	7,108	7,246	22,837	12,659	7,439	2,196	6,439	9,977	3,581
Chums	21,412	30,946	165,717	90,464	112,364	160,812	40,849	70,727	52,758	37,734	39,167	5,551	.....	.....	.....	.....
Pinks	14,818	247,149	110,300	201,847	112,209	143,615	83,626	111,930	83,430	128,296	64,312	20,098	6,148	23,538	23,300	7,964
Cohoes	18,203	33,807	35,011	42,331	30,201	70,431	48,966	43,254	28,328	65,806	42,457	19,460	13,532	20,709	25,754	11,759
Steelhead Trout	204	3,721	702	1,009	865	712	985	.....	.....	.....	.....	.....	.....	36	2	.....
Bluebacks	2,586	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Totals	80,568	395,728	381,163	404,793	294,597	432,366	313,894	320,168	235,898	334,187	226,461	123,054	71,708	99,089	99,192	68,785

TOTAL PACKED BY DISTRICTS IN 1906 TO 1921, INCLUSIVE.

	1921.	1920.	1919.	1918.	1917.	1916.	1915.	1914.	1913.	1912.	1911.	1910.	1909.	1908.	1907.	1906.
Fraser	107,650	136,661	167,944	210,851	402,538	127,472	320,519	349,294	782,429	199,322	301,344	247,994	623,469	112,425	163,116	240,486
Skeena	234,765	332,787	398,877	374,216	292,219	223,158	279,161	237,634	164,055	254,258	254,410	222,035	140,739	209,177	159,255	162,420
Rivers Inlet	59,272	157,522	80,367	103,155	95,302	85,383	146,838	109,052	68,096	137,697	101,066	179,398	91,014	75,090	94,064	122,378
Nass River	51,765	81,153	97,512	143,908	119,495	126,686	104,289	94,890	53,423	71,162	65,684	39,720	40,990	46,908	31,832	32,534
*Vancouver Island	69,528	84,170	267,293	389,815	325,723	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Outlying Districts	80,568	395,223	381,163	404,793	294,597	432,366	313,894	320,169	285,898	334,187	226,461	123,054	71,708	99,089	99,192	68,785
Grand totals	603,548	1,187,616	1,393,156	1,626,738	1,557,485	995,065	1,164,701	1,111,039	1,353,901	996,626	948,965	762,201	967,920	542,689	547,459	627,103

STATEMENTS SHOWING SALMON-PACK OF PUGET SOUND, BY SPECIES, FROM 1906 TO 1921.

	1921.	1920.	1919.	1918.	1917.	1916.	1915.	1914.	1913.	1912.	1911.	1910.	1909.	1908.	1907.	1906.
Sockeyes	102,967	62,654	64,346	50,723	411,538	84,637	87,465	357,374	1,665,728	201,572	140,529	234,437	1,005,120	162,228	96,974	182,241
Cohoes	89,412	24,502	210,883	235,860	114,276	155,832	180,799	151,135	49,150	149,977	244,208	154,077	139,297	95,863	111,611	98,206
Puget Sound Pinks	404,713	4,669	421,215	6,605	1,121,884	1,887	589,780	909	788,789	708	1,038,136	.....	365,156	.....	448,730	.....
Chums	30,831	48,849	525,541	267,538	216,285	427,878	410,687	280,070	50,176	63,132	111,143	148,810	52,251	51,186	51,840	155,221
Totals	527,923	140,520	1,221,985	560,726	1,863,983	670,234	1,268,731	780,488	2,553,843	415,389	1,534,016	537,324	1,561,824	309,277	709,155	435,668

*Previously the Vancouver Island pack was shown in Outlying Districts pack.

ELEVENTH ANNUAL REPORT

OF THE

SUPERINTENDENT OF INSURANCE

FOR THE

PROVINCE OF BRITISH COLUMBIA

1922

(BUSINESS TRANSACTED IN 1921)

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1922.

To His Honour WALTER CAMERON NICHOL,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

The undersigned has the honour to present the Eleventh Annual Report of the Superintendent of Insurance for the year ended December 31st, 1921.

A. M. MANSON,

Attorney-General.

Victoria, B.C., July 14th, 1922.

REPORT OF THE SUPERINTENDENT OF INSURANCE.

DEPARTMENT OF INSURANCE,
VICTORIA, B.C., July 14th, 1922.

The Honourable A. M. Manson,
Attorney-General, Victoria, B.C.

SIR,—The Eleventh Annual Report of the Department, covering the year ended December 31st, 1921, is hereby submitted in accordance with the "British Columbia Fire Insurance Act" and "Insurance Act."

I. "BRITISH COLUMBIA FIRE INSURANCE ACT."

(1.) FIRE INSURANCE COMPANIES.

The year 1921 closed with a further increase in the number of companies licensed under this Act for fire insurance. The total was 139, of which all except two also hold Dominion licences.

The new British companies were: The Autocar Fire and Accident Insurance Company, Limited; The Merchants Marine Insurance Company, Limited; National Provincial Plate Glass & General Insurance Company, Limited; and The Patriotic Assurance Company, Limited.

Three were Canadian companies—namely, Merchants Casualty Company, Reliance Insurance Company of Canada, and Scottish Canadian Assurance Corporation; and one, the American Equitable Assurance Company of New York (a reorganization of a company of a similar name previously licensed under the Act), came from the United States.

Two of the companies licensed under this Act in 1921 were already licensed under the "Insurance Act."

A complete list of the companies licensed as at December 31st, 1921, is printed on pages 25 and 26, and the origin of the various companies is as follows:—

Dominion of Canada	30
Provinces of Canada	8
Great Britain	43
Australia	1
Hong Kong	4
United States	49
France	4
Total	139

In comparison with the year 1920 the fire premiums decreased by $617,000, while the losses were increased by $497,000 (statistics will be found on pages 29 and 30). For the five months ending May 31st, 1922, the losses reported amount to $1,250,000, which, if they continue at this rate, would indicate that the total will far exceed that of other years.

A great many are under the impression that the item "net premiums received" is profits for one year, whereas the figures include all three-year business written during 1921, and in addition to this must be deducted the overhead expenses, such as commissions, office management, adjustment charges, etc.

The fire-prevention officer, J. A. Thomas, was kept busy, and appended are extracts from his report:—

"*Fire Inquiries.*—At the request of municipal authorities and others, and on instructions from yourself, a large number of inquiries have been held during the year. It has not always been the object of these inquiries to detect cases of arson, although in some cases indictments have followed as a result of evidence secured. In all cases, however, the moral effect and publicity obtained has brought excellent results. The facts brought out under oath have been of great value in outlining fire-prevention methods.

"*Inspections.*—The demand for inspections from the cities and towns, as well as from industrial plants and hospitals throughout the Province, has greatly increased through the year. This work has been limited by the physical inability of your officer to meet the demands on his time. It is obvious that when the 'Fire Marshal Act' comes into force on January 1st, additional help will be required to meet this situation.

"*Conflagration Hazards.*—These hazards, in the shape of old and dilapidated buildings, are still an outstanding feature of our cities and towns. This is largely due to the fact that there is no Provincial law whereby we can control the situation. Where there are local by-laws they are not being enforced, and there seems to be no way of compelling city or municipal authorities to enforce them. This matter, however, has been taken care of in the 'Fire Marshal Act' and we hope for better results next year.

"*Refuse-burners in Industrial Plants.*—The proper solution for this hazard has not yet been reached. A number of complaints have reached this office from citizens whose property is exposed from the sparks coming from these burners. In the City of Victoria a lumber-manufacturing company was taken into Court under a local by-law and fined for maintaining a hazard of this description. The evidence brought out in this case shows that this hazard is common to all cities where the refuse from sawmills is consumed in burners. There has been no burner devised that will properly consume the refuse from these mills. A great deal of thought and study have been given to this matter, and we hope in the near future to devise some methods whereby it may be controlled.

"*Fire-protection in Unorganized Districts.*—This is a serious question and will of necessity have to be dealt with by the Legislature in the near future. Under the present system it is provided for by voluntary contributions on the part of business-men. Absentee property-owners and the foreign element, who as a rule maintain the most serious hazards in the town, do not contribute. The outcome of this haphazard method is that the fire-protection equipment is entirely inadequate to cope with a fire of any size, and a total loss of the property involved and sometimes loss of life is the result of a fire. I cannot urge too strongly the need of bringing this question to the attention of the Honourable Attorney-General, with the view of devising some means whereby the unorganized towns may levy a tax on property-owners and tenants, to be used for fire-prevention and fire-protection purposes.

"*Fire-prevention in the Cities and Municipalities.*—This work is better organized than ever before. It has been my privilege throughout the year to address a number of public bodies as well as Councils. I have tried to point out the necessity for systematic inspection to prevent fires and reduce insurance rates. The great handicap in this work is the need of fire-prevention laws and of trained inspectors to do the work of inspection. While in the larger cities we have such laws and men who are qualified to make inspections, in the larger towns there is almost a total lack of such laws and inspectors. Because of this, in some of our larger towns I find serious hazards existing which should not be allowed. It is obvious that these conditions have a great effect on the insurance rates in those cities and towns where they exist. I feel, however, that our 'Fire Marshal Act,' when it is put in force, will relieve this situation very materially."

II. "INSURANCE ACT."

At the end of 1921 there were 143 companies licensed under this Act, only four new companies having obtained licences, as compared with eleven in 1920. A list of these will be found on page 27.

All of these companies were British—namely, Commercial Union Assurance Company, Limited; The London & Lancashire Insurance Company, Limited; Union Assurance Society, Limited; and the Merchants Marine Insurance Company, Limited; the first three companies already held licences under the "British Columbia Fire Insurance Act."

In addition to the new licences, eight supplementary licences were issued to companies already licensed under the Act.

The Great North Insurance Company ceased business in the Province during the year, but its deposit was not released until April, 1922.

Lloyds Plate Glass Insurance Company withdrew during the year.

SUMMARY.

Where incorporated.	Dominion Licensees.	Provincial Licensees.	Total.
British Columbia	..	2	2
Canada	40	..	40
Other Provinces	2	2	4
Great Britain	31	10	41
Australia	1	..	1
New Zealand	..	1	1
Hong Kong	2	2	4
Japan	..	1	1
United States	47	2	49
Totals	123	20	143

Miscellaneous Insurance.—All companies writing this class of insurance have had their trying times, especially those writing automobile, where the premium income was $82,700 less than 1920, while the losses were $73,000 greater during the same period.

An important conference of the Superintendents of Insurance for the various Provinces was held in Quebec in October last, Ontario, Manitoba, Saskatchewan, Alberta, and Quebec being represented, but owing to the fall session of our Provincial Legislature convening on October 18th, and as your predecessor was introducing at that session the Acts creating the office of Fire Marshal and also the licensing of agents and adjusters, he deemed it wise that I should be on the ground in case any explanations were necessary; consequently this Province was not represented. This year we are to be honoured by the Superintendents of the several Provinces meeting in Vancouver on August the 9th, 10th, 11th, and 12th. At this convention important legislation will be considered. Among other items will be the following:—

Uniform statutory conditions for fire policies.

Uniform Life-insurance Policies Act.

Uniform automobile-insurance policy conditions.

Uniform sickness and accident insurance policy conditions.

The "Fire Marshal Act" became effective January 1st of the present year, and Mr. J. A. Thomas, owing to his efficient work as fire-prevention officer, was appointed. Unfortunately the Act relative to agents and adjusters was not passed, owing, no doubt, to opposition by some who did not realize the necessity of such an Act, but I trust you, in your official capacity as head of this Department, will reintroduce it at the next session.

The time has now arrived when the Insurance Acts of this Province should be revised, and as the question of the Model Fire Policy Act and also the Model Life Insurance Act will be discussed at the forthcoming convention of Superintendents, I have no doubt, from the discussions which will take place, that we will be in a better position to consolidate our several Acts.

Since taking office in July last I have discussed with the British Columbia Fire Underwriters' Association (following the annual meeting of the C.F.U.A. at Niagara Falls, Ontario, in June, 1921) the question of rates, and at the present time all dwellings and non-hazardous risks are being reduced as from August 1st, 1921, which action gives an average reduction of 27 per cent. The City of Victoria, owing to rerating being completed, is also enjoying the reduction upon its mercantile property of an approximate average of 22 per cent. The new rates will be checked from time to time, and when the whole Province is rerated I feel there will be a substantial reduction all round.

At the present time this Department does not possess any authority over the insurance companies other than to issue licences for them to transact business in the Province, and while the present is not opportune for such legislation, I feel that the time must come when action will be necessary, and all companies will be placed more directly under the control of this Department and will be required to file schedules of rates and submit other questions of importance to the Superintendent.

At the present time data are being accumulated as to the legislation in effect in the various Provinces of Canada and States of the Union, which, when properly completed, will be laid before you for consideration by the Executive.

I have the honour to be,

Sir,

Your obedient servant,

J. P. DOUGHERTY,

Superintendent of Insurance.

APPENDIX.

Annual Statements of Provincial Licensees for the Year ended December 31st, 1921.

BRITISH COLUMBIA PLATE GLASS INSURANCE COMPANY.

Head Office—Vancouver, B.C.

Directors.

Walter E. Graveley.
F. M. Chaldecott.
A. G. Thynne.
H. W. Chamberlain.
W. J. Albutt.

Alfred Farmer, Secretary.

Amount deposited with the Government of British Columbia: British Columbia Inscribed Stock, £200; Township of Richmond bonds, $5,000; Dominion of Canada War Loan bonds, $1,000; total (par), $6,972.22.

Authorized capital	$25,000
Amount subscribed	9,600
Amount paid up	3,840

STATEMENT FOR THE YEAR ENDED DECEMBER 31ST, 1921.

Assets.

Cash value (excluding interest and dividends) of stock, shares, bonds, debentures, etc.	$20,471 93
Cash on deposit to the Company's credit and not drawn against on December 31st, 1921	2,023 98
Premiums uncollected (net commissions deducted)	7,121 30
Interest due or accrued and unpaid	133 26
Amount of all other assets	3,834 54
Total assets	$33,585 01

Liabilities.

Total reserve of unearned premiums, $27,805.41; carried out at 80 per cent. thereof	$22,244 32
Total amount of liabilities	$22,244 32
Capital stock paid up	3,840 00
Total of liabilities and paid-up capital	$26,084 32
Excess of assets over such total	$ 7,500 69

Receipts.

Net cash received for premiums	$24,668 18
Cash received for interest	1,029 97
Cash from all other sources	607 21
Total receipts	$26,305 36

Expenditure.

Cash paid to agents for commission, salaries, and bonus	$ 8,633 85
„ for statutory assessment and licence fees	367 99
„ „ rent and taxes	264 37
„ „ salaries, directors' and auditors' fees	720 00
„ „ printing, stationery, and advertising	102 00
„ „ postage, telegrams, and express	36 00
„ „ other expenses	22 50
Total expenses of management	$10,146 71
Amount paid for losses occurring in previous years	910 14
Amount paid for losses occurring during the year	11,627 56
Cash paid for debentures, mortgages, etc, (not extended), $3,343.75.	
Cash paid for other expenditure	40 58
Total expenditure	$22,724 99

LIST OF SHAREHOLDERS.

Name.	Residence.	No. of Shares.	Amount subscribed.	Amount paid.
H. Bell-Irving	Vancouver...	5	$ 500	$ 200
W. E. Graveley	„ ...	5	500	200
A. Mc. Creery	„ ...	1	100	40
A. F. Beasley	Victoria.....	7	700	280
T O. Rchards	Vancouver...	1	100	40
H. W. Chamberlin	„ ...	5	500	200
H. C. Ackroyd	„ ...	1	100	40
D. B. Charleson	„ ...	1	100	40
W. J. Albutt	„ ...	17	1,700	680
R. Martin	„ ...	1	100	40
J. Rogers	„ ...	2	200	80
A. G. Thynne	„ ...	35	3,500	1,400
F. M. Chaldecott	„ ...	5	500	200
C. E. Hope	„ ...	2	200	80
T. A. Blythe (estate of)	„ ...	3	300	120
P. W. Charleson	„ ...	5	500	200
		96	$9,600	$3,840

CANTON INSURANCE OFFICE, LIMITED.

Head Office—Victoria, Hong Kong.

Consulting Committee.

D. G. M. Bernard.
A. M. Bowes-Smith.
The Hon. Sir Paul Chater, C.M.G.
E. J. Chapman.
Sir Robert Ho Tung.
T. E. Pearce.
H. W. Sassoon.
H. P. White.

General Agents.

Messrs. Jardine, Matheson & Co., Ltd., Hong Kong.

Capital authorized and subscribed	$2,500,000
Amount paid up	1,000,000

STATEMENT FOR THE YEAR ENDED DECEMBER 31ST, 1921.

Assets.

Cash in hand, in transit, and on current account, and fixed deposits with banks		$ 939,152 94
Gold investments—		
British, Indian, and Colonial Government bonds and stocks		4,390,650 25
Foreign Government loans		584,124 67
British, Colonial, and Foreign railway and port trust bonds and stocks		288,463 90
Silver investments—		
Hong Kong Government 6% War Loan of 1916		100,000 00
Mortgages, loans, and debentures		1,588,917 80
Other investments		480,650 74
Agency balances		662,242 73
Accounts receivable		187,803 00
Total assets		$9,222,006 03

Liabilities.

Capital, 10,000 shares of $250 each = $2,500,000, of which $100 per share has been paid up		$1,000,000 00
Reserve Fund		1,935,483 87
Reinsurance Fund		1,339,778 61
Investment and Exchange Fluctuation Account		534,464 92
Underwriting Suspense Account		1,012,224 31
Uncollected dividends		30,595 00
Accounts payable		160,176 23
Working Account, 1920	$1,049,630 19	
Less interim dividend at $18 per share paid on May 19th, 1921	180,000 00	
		869,630 19
Working Account, 1921		2,339,652 90
Total liabilities		$9,222,006 03

NOTE.—Dollars in Hong Kong currency, with sterling exchange at 2s. 7d.

LONDON & PROVINCIAL MARINE & GENERAL INSURANCE COMPANY, LIMITED

Head Office—London, England.

Directors.

Edwin Gray, Chairman.
James W. Arbuthnot.
James Hamilton.
Richard de Neufville.
Herbert E. Secretan.
William M. Strachan.

Irving H. Cortazzi, Secretary.

Capital authorized and subscribed £1,000,000
Amount paid 100,000

STATEMENT FOR THE YEAR ENDED DECEMBER 31ST, 1921.

Assets.

		£ s. d.
By Mortgages—		
On property within the United Kingdom	£14,000 0 0	
On property out of the United Kingdom	26,133 18 1	
On policies of life assurance	3,400 0 0	
		43,533 18 1
Investments (valued as at December 31st, 1919; investments made since that date are valued at cost)		1,063,765 10 3
Due from other companies and agents		75,915 18 5
Interest accrued but not payable		10,158 2 3
Cash on deposit at bankers and in hand		42,720 9 0
Sundry debtors		190 2 11
Lease and furniture, Fire Department	£658 15 6	
Less amount written off	198 15 6	
		460 0 0
Policy stamps in hand		625 12 2
Total assets		£1,237,369 13 1

Liabilities.

		£ s. d.
To Authorized capital, 100,000 shares of £10 each = $1,000,000.		
Paid-up capital, 100,000 shares of £10, £1 paid		100,000 0 0
Marine Insurance Fund		438,425 2 2
Fire and Accident Insurance Fund		38,584 15 10
Profit and Loss Account		44,746 16 1
General Reserve Fund		200,000 0 0
Investment Reserve Fund		125,000 0 0
	£	946,756 14 1
Claims admitted or intimated but not paid—		
Marine	£2,095 15 5	
Fire	7,460 12 1	
		9,556 7 6
Outstanding charges and reserve for Government taxes		156,166 1 2
Due to other companies and agents		124,583 5 5
Bills payable		293 9 9
Unclaimed dividends		13 15 2
Total liabilities		£1,237,369 13 1

MARITIME INSURANCE COMPANY, LIMITED.

Head Office—Liverpool, England.

Directors.

Edward Hatton Cookson, Chairman.
Johan Frederick Caroe.
James Allan Cook.
Harold Sumner.
Jasper Muirhead Wood.

Henry Edward Stephens, Secretary.

Authorized capital	£1,000,000
Amount subscribed	500,000
Amount paid up	100,000

STATEMENT FOR THE YEAR ENDED DECEMBER 31ST, 1921.

Assets.

	£	s.	d.
By Investments	1,174,277	13	0
Sundry debtors	124,443	16	1
Interest and dividends accrued, but not payable until after Dec. 31st, 1921	4,742	8	2
Cash on deposit, in hand, and on current account	29,786	18	1
Total assets	£1,333,250	15	4

Liabilities.

	£	s.	d.
To Shareholders' capital paid up	100,000	0	0
General Reserve Fund	200,000	0	0
Underwriting Fund	640,714	10	1
Profit and Loss Account	185,066	8	10
	£1,125,780	18	11
Sundry creditors	207,469	16	5
Total liabilities	£1,333,250	15	4

NATIONAL PLATE GLASS INSURANCE COMPANY.

Head Office—Winnipeg, Man.

Amount deposited with the Government of British Columbia: City of Salmon Arm bonds, $5,000; City of Nelson bonds, $300; City of Alberni bonds, $210; total (par), $5,510.

No business transacted in British Columbia during 1921.

NEW ZEALAND INSURANCE COMPANY, LIMITED.

Head Office—Auckland, New Zealand.

No report received from this company.

THE OCEAN MARINE INSURANCE COMPANY, LIMITED.

Head Office—London, England.

Directors.

Hon. Charles Napier Lawrence, Chairman.
Sir Alex. Drake Kleinwort, Bt.
Herbert Robinson Arbuthnot.
Harry Cunningham Brodie.
James Blyth Currie.
Philipp Moritz Deneke.
Maurice Ruffer.
Philip Secretan.
David Nairn Shaw.

H. T. Russell Ross, Secretary.

Capital authorized and subscribed	£1,000,000
Amount paid up	100,000

STATEMENT FOR THE YEAR ENDED DECEMBER 31ST, 1921.

Assets.	£	s.	d.
British Government securities	317,683	15	0
Public Boards, United Kingdom	5,562	10	0
Municipal and country securities, United Kingdom	38,875	0	0
Indian and Colonial Government securities	63,330	0	0
Colonial municipal securities	13,737	10	0
Foreign Government securities	120,293	2	10
Foreign municipal securities	67,705	7	2
Guaranteed anad other Indian railway stock	11,225	0	0
Indian Government railway annuities	9,275	0	0
Railway and other debentures, home and foreign	125,445	1	7
Railway preference and guaranteed stocks	7,531	5	0
Railway and ordinary stocks	9,901	0	0
Loans on stocks and shares	233,437	10	0
	£1,024,002	1	7
Freehold premises	123,000	0	0
	£1,147,002	1	7
Agents' balances	84,017	0	2
Outstanding premiums, etc.	110,685	11	11
Bills receivable	107	3	6
Interest accrued but not yet payable	9,982	0	0
Policy stamps on hand	454	0	8
Cash—			
On deposit	93,455	7	8
In hand and on current account	6,391	19	7
Total assets	£1,452,095	5	1

Liabilities.	£	s.	d.
Capital, 40,000 shares of £25, paid up £2 10s. per share (now vested in the North British and Mercantile Insurance Company, Limited)	100,000	0	0
Marine Fund—			
Reserve	£500,000 0 0		
Profit and loss	232,307 4 0		
	732,307	4	0
Reserve for 1920 and previous years	176,745	9	6
Balance of Underwriting Account, 1921	160,485	14	0
Sundry creditors	282,556	17	7
Total liabilities	£1,452,095	5	1

RELIANCE MARINE INSURANCE COMPANY, LIMITED.

Head Office—Liverpool, England.

(No report received from this Company.)

ROYAL PLATE GLASS INSURANCE COMPANY OF CANADA.

Head Office—Vancouver, B.C.

Directors.

Dr. D. H. Wilson. R. W. Harris.
W. H. Malkin. A. P. Bogardus.
J. P. Nicolls. C. A. Wickens.

Edgar S. Smith, Secretary.

Amount deposited with the Government of British Columbia: Deposit receipt of Canadian Bank of Commerce, $125; Dominion War Loan bonds (par), $5,000; total, $5,125.

Authorized capital	$25,000
Amount subscribed	10,000
Amount paid up	2,750

STATEMENT FOR THE YEAR ENDED DECEMBER 31ST, 1921.

Assets.

Cash value of mortgages, exclusive of interest	$ 4,250 00
Cash value (excluding interest and dividends) of stock, shares, bonds, debentures, etc.	7,060 73
Cash on hand at Head Office	183 39
Agents' balances and premiums uncollected	1,032 37
Interest due or accrued and unpaid	54 76
Commissions paid in advance	1,242 72
Total assets	$13,823 97

Liabilities.

Claims or losses adjusted, remaining unpaid	$ 88 98
Reserve of unearned premiums	4,142 46
Amount of all other liabilities	73 73
Total amount of liabilities	$ 4,305 17
Capital stock paid up	2,750 00
Total amount of liabilities and paid-up capital	$ 7,055 17
Excess of assets over such total	$ 6,768 80

Receipts.

Net cash received for premiums	$ 5,185 87
Cash received for interest	565 00
Total receipts	$ 5,750 87

Expenditure.

Cash paid to agents for commission, salaries, and bonus	$ 1,323 01
„ for interest, discount, and exchange	1 95
„ „ statutory assessment and licence fees	60 38
„ „ salaries, directors' and auditors' fees	150 00
„ „ printing, stationery, and advertising	39 49
Total expenses of management	$ 1,574 83
Amount paid for losses occurring prior to 1921	628 76
Amount paid for losses occurring during 1921	1,582 78
Cash paid for debentures, mortgages, etc. (not extended), $2,000.	
Total expenditure	$ 3,786 37

LIST OF SHAREHOLDERS.

Name.	Residence.	No. of Shares.	Amount subscribed.	Amount paid.
A. P. Bogardus	Vancouver	10	$ 1,000	$ 275 00
D. H. Wilson	„	14	1,400	385 00
R. W. Harris	„	14	1,400	385 00
W. H. Malkin	„	14	1,400	385 00
C. A. Wickens	„	8	800	220 00
P. G. Mason	„	8	800	220 00
J. P. Nicolls	„	5	500	137 50
I. Douglas	Boston, U.S.A.	12	1,200	330 00
M. Douglas	„ „	5	500	137 50
R. D. Douglas	Binghamton, U.S.A.	5	500	137 50
N. S. Douglas	„ „	5	500	137 50
		100	$10,000	$2,750 00

STANDARD MARINE INSURANCE COMPANY, LIMITED.

Head Office—Liverpool, England.

Directors.

F. W. Pascoe Rutter, Chairman.
John H. Clayton.
Walter B. Duckworth.
A. Percy Eccles.
Edward Marquis.
James G. Nicholson.

N. B. Barnes, Secretary.

Capital authorized and subscribed	£500,000
Amount paid up	100,000

STATEMENT FOR THE YEAR ENDED DECEMBER 31ST, 1921.

Assets.	£	s	d.
Investments and loans	932,825	7	7
Cash at bankers and in hand	74,570	0	5
Bills receivable	954	12	9
Sundry debtors	379,780	7	6
Accrued interest	12,843	6	0
Stamps in hand	392	5	4
Total assets	£1,401,365	19	7

Liabilities.

	£	s.	d.
Capital, 25,000 shares of £20 each, £4 per share paid	100,000	0	0
Reserve Fund	500,000	0	0
Reserve for unexpired risks	103,300	0	0
Provision for income-tax, 1921, and excess profits duty, 1917 and 1918	134,554	15	0
Provision for corporation-tax	10,650	0	0
Balance, Profit and Loss Account	151,988	10	3
Dividend for the year 1921	56,000	0	0
Bills payable	334	16	11
Claims outstanding	199,191	0	0
Sundry creditors	145,346	17	5
Total liabilities	£1,401,365	19	7

THE TOKIO MARINE & FIRE INSURANCE COMPANY, LIMITED.

Head Office—Tokio, Japan.

Directors.

M. Suyenobu, Chairman.
K. Kagami.
H. Hirao.
T. Abe.
S. Kirishima.
T. Majima.
S. Sasaki.
Baron K. Sonoda.
K. Yamanari.

Capital authorized and subscribed	Y. 30,000,000
Capital paid up	15,000,000

STATEMENT FOR THE YEAR ENDED DECEMBER 31ST, 1921.

Assets.

	Yen	sen.
Capital unpaid	15,000,000	00
Office premises, etc.	1,645,000	00
Japanese Government and municipal securities	15,190,880	00
Foreign Government and municipal securities	10,075,123	39
United States railway and other bonds and shares	2,073,345	60
Bonds, debentures, and stocks of various companies	14,880,025	22
Loans on mortgages, etc.	27,791,491	90
Accounts due to the Company	763,639	10
Cash at bankers on deposit and current accounts and in hand	9,901,197	42
Total assets	Y. 97,320,702	63

Liabilities.

		Yen	sen.
Share capital		30,000,000	00
Legal Reserve Fund		3,750,000	00
Underwriting Fund—			
Underwriting Reserve	Y. 38,000,000 00		
Underwriting Suspense	10,630,896 48		
		48,630,896	48
Buildings Depreciation Fund		125,000	00
Staff Pension Fund		552,693	16
Accounts due by the Company		7,302,539	84
Profit and Loss Account		6,959,573	15
Total liabilities		Y. 97,320,702	63

UNION FIRE AND CASUALTY COMPANY.

Head Office—Winnipeg, Man.

Directors.

S. D. Works.
J. O. Melin.
Geo. J. Deutz.
J. E. Burchard.
Col. D. McLean.
D. Gunn.
F. Kennedy.
R. L. Nicolson.
K. Everett.
R. B. Graham.

Geo. J. Deutz, Secretary.

Amount deposited with the Government of British Columbia: Toronto Harbour Commissioner bonds (par value), $20,000; Dominion War Loan bonds (par value), $13,600; total, $33,600.

Authorized capital	$500,000 00
Amount subscribed	500,000 00
Amount paid up in cash	100,505 55

STATEMENT FOR THE YEAR ENDED DECEMBER 31ST, 1921.

Assets.

Cash value of real estate, less encumbrances	$ 4,552 20
Cash value of mortgages, exclusive of interest	13,550 00
Cash value (excluding interest and dividends) of stock, shares, bonds, debentures, etc.	135,748 76
Cash on hand at Head Office	1,200 00
Cash on deposit to the Company's credit and not drawn against on Dec. 31st, 1921	6,450 47
Agents' balances	90,298 79
Interest due and accrued and unpaid	4,877 78
Premiums in the course of collection	6,000 00
Amount of all other assets	31,354 54
Office furniture (not extended), $20,566.78.	
Plans, agency plant (not extended), $10,956.42.	
Total assets	$294,032 54

Liabilities.

Claims or losses in suspense, or supposed, or reported	$ 45,827 83
Reinsurance reserve for insurance contracts in force	29,000 38
Total reserve of unearned premiums for all outstanding risks	76,454 87
Amount of all other liabilities	53,392 76
Total amount of liabilities	$204,685 84
Capital stock paid up in cash	100,505 55
Total of liabilities and paid-up capital	$305,191 39
Excess of liabilities over assets	$ 11,158 85

Receipts.

Net premiums received in cash	$312,633 61
Cash received for interest	8,578 48
Cash received for debentures, mortgages, etc. (not extended), $11,389.81.	
Cash from all other sources	26,712 46
Total receipts	$347,924 55

Expenditure.

Cash paid to agents for commission, salaries, and bonus	$ 91,773·39
„ for law costs	935 00
„ „ investigation and adjustment of claims	4,993 12
„ „ interest, discount, and exchange	1,253 01
„ „ statutory assessment and licence fees	9,054 10
„ „ travelling expenses	7,127 92
„ „ rent and taxes	7,293 29
„ „ salaries, directors' and auditors' fees	53,272 04
„ „ printing, stationery, and advertising	11,456 54
„ „ postage, telegrams, and express	5,847 29
„ „ other expenses	30,481 14
Total expenses of management	$223,486 84
Amount paid for losses occurring prior to 1921	22,924 17
Amount paid for losses, other than fire, occurring during 1921	79,399 00
Amount paid for fire losses occurring during 1921	37,666 65
Cash paid for dividends	5,000 00
Cash paid for other expenditure	33,412 71
Cash paid for debentures, mortgages, etc. (not extended), $7,215.60.	
Total expenditure	$401,889 37

RETURNS FOR BRITISH COLUMBIA.

Deposit with Government: Toronto Harbour Commissioner bonds, $20,000; Dominion War Loan bonds, $13,000 (par value)	$33,600 00
Assets (cash, $203.14; agents' balances, $4,935.48; premiums in course of collection, $900)	6,038 62
Liabilities	10,436 59
Premiums received	25,248 70
Losses incurred	3,330 21
Losses paid	3,330 21
Net amount at risk	29,019 63

NOTE.—This Company has ceased to transact business in the Province, and has reinsured its business with the Merchants Casualty Company.

WAWANESA MUTUAL INSURANCE COMPANY.

Head Office—Wawanesa, Man.

Directors.

S. H. Henderson.
E. H. Dewart.
S. Reid.
M. McKellar.
G. H. Stephens.
R. Wallace.
A. J. Elliott.

A. F. Kempton, Secretary.

Amount deposited with the Government of British Columbia: Dominion War Loan bonds (par), $25,000.

STATEMENT FOR THE YEAR ENDED DECEMBER 31ST, 1921.

Assets.

Cash value of real estate, less encumbrances	$ 16,763 91
Cash value of bonds, debentures, etc.	316,900 00
Cash on hand at Head Office	1,760 78
Cash on deposit to the Company's credit and not drawn against on Dec. 31st, 1921	86,463 06
Agents' balances	109 29
Amount unpaid for instalments for year 1921	2,397 31
Amount unpaid for instalments (not extended), $32,729.16.	
Amount unpaid of assessments which were levied during 1921	73,960 96
Amount unpaid of assessments levied in prior years	6,830 57
Amount unpaid of assessments levied in prior years (not extended), $94,188.15.	
Amount of premium notes in force after deducting all payments thereon and assessments levied (not extended), $1,404,328.99.	
Amount of interest due or accrued	3,286 05
Office furniture, etc. (not extended), $4,628.58.	
Total assets	$508,471 93

Liabilities.

Amount required to reinsure all outstanding risks taken on cash system, being 50 per cent. of gross premiums on all cash system policies in force at Dec. 31st, 1921	$115,252 12
Total liabilities	$115,252 12

Receipts.

Cash received as fixed payments due 1921	$ 3,886 64
Cash received by Company as fixed payments due in prior years	6,157 09
Cash received for assessments levied in 1921	190,009 56
Cash received for assessments levied in years prior to 1921	45,052 60
Cash received for premiums on cash system	77,375 26
Cash received for interest during 1921	18,534 27
Cash received for agents' balances of 1920	464 04
Total receipts	$341,479 46

Expenditure.

Cash paid for commissions or allowances of any kind to agents	$ 50,952 25
„ „ law costs	737 02
„ „ fuel and light	1,441 06
„ „ investigation and adjustment of claims	7,585 62
„ „ statutory assessment and licence fees	415 00
„ „ travelling expenses	3,131 65
„ „ rent and taxes	3,636 08
„ „ salaries, directors' and auditors' fees	40,865 72
„ „ printing, stationery, and advertising	7,844 32
„ „ postage, telegrams, and express	6,186 94
„ „ other expenses	3,526 82
Total expenses of management	$126,322 48
Cash paid for losses occurring during 1921	221,109 55
„ „ rebate, abatement, and returned premiums	4,091 21
„ „ purchase of debentures, mortgages, etc. (not extended), $24,684.20.	
„ „ other expenditure	423 97
Total expenditure	$351,947 21

RETURNS FOR BRITISH COLUMBIA.

Deposit with Government, Dominion War Loan bonds (par)	$ 25,000 00
Other assets	1,849 91
Liabilities	1,495 27
Premium notes	35,348 17
Gross premiums received	6,840 24
Losses incurred, net	13,403 15
Losses paid, net	13,403 15
Net amount at risk	2,372,504 00

WESTERN EMPIRE LIFE ASSURANCE COMPANY.

Head Office—Winnipeg, Man.

Directors.

William Smith. G. N. Broatch.
Dr. A. J. Fraser. F. D. Byers.
R. W. Craig, K.C. S. D. Hannah.
Brig.-Gen. H. M. Dyer. G. E. Graham.

F. C. O'Brien, Secretary.

Amount deposited with the Government of British Columbia: 27 Dominion Victory Loan bonds (par), $27,000.

Authorized capital	$1,000,000 00
Amount subscribed	1,000,000 00
Called capital	250,000 00
Amount paid up in cash	209,610 40

STATEMENT FOR THE YEAR ENDED DECEMBER 31ST, 1921.

Assets.

Cash value of real estate, less encumbrances	$ 15,319 60
Cash value of mortgages, exclusive of interest	68,871 12
Loans, other than those secured by mortgages	49,958 53
Cash value (excluding interest and dividends) of stock, shares, bonds, debentures, etc.	288,977 73
Actual cash on hand at Head Office	5,303 96
Cash on deposit to the Company's credit and not drawn against on Dec. 31st, 1921	10,979 86
Premiums uncollected	94,055 93
Interest due or accrued and unpaid	15,635 46
Calls on capital stock outstanding in course of collection	40,389 60
Premium on capital	82,724 56
Amount of all other assets	47,821 35
Office furniture (not extended), $4,292.60.	
Total assets	$72,037 70

Liabilities.

Claims or losses adjusted	$ 3,246 73
Amount of unpaid loans	23,500 00
Reinsurance reserve for life-insurance contracts in force	421,577 00
Amount due or accrued for salaries, printing, etc.	331 05
Amount of all other liabilities	2,855 20
Total amount of liabilities	$451,509 98
Capital stock paid up in cash	209,610 40
Total of liabilities and paid-up capital	$660,120 38
Excess of assets over such total	$ 59,917 32

Receipts.

Net premiums received in cash	$143,064 50
Cash received for interest	30,162 00
Cash received for calls on capital stock	9,944 35
Cash from all other sources	29,948 24
Cash received for debentures, mortgages, etc. (not extended), $21,548.96.	
Total receipts	$213,119 09

Expenditure.

Cash paid to agents for commission, salaries, and bonus	$ 36,612 28
„ for law costs	1,678 23
„ „ medical examiners' fees	3,857 50
„ „ interest, discount, and exchange	705 61
„ „ statutory assessment and licence fees	2,639 53
„ „ travelling expenses	880 95
„ „ rent and taxes	2,520 00
„ „ salaries, directors' and auditors' fees	21,221 25
„ „ printing, stationery, and advertising	7,683 47
„ „ postage, telegrams, and express	1,769 93
„ „ other expenses	11,675 06
Total expenses of management	$ 91,243 81
Amount paid for losses occurring prior to 1921	275 00
Amount paid for losses occurring during 1921	21,644 05
Cash paid for dividends	284 48
Cash paid for other expenditure	18,442 00
Cash paid for debentures, mortgages, etc. (not extended), $90,610.02.	
Total expenditure	$131,889 34

RETURNS FOR BRITISH COLUMBIA.

Deposit with Government, Victory Loan bonds (par)	$ 27,000 00
Assets (real estate, $15,319.60; mortgages, $11,525; loans, $2,493.60; cash, $3,704.55; premiums uncollected, $7,466.40; interest, $654.90; calls on capital stock, $1,000; premium on capital, $1,540; non-forfeiture loans, $2,848.85)	73,552 90
Liabilities	28,244 50
Premiums received	16,589 23
Losses incurred, net	*Nil*
Losses paid, net	*Nil*
Net amount at risk	563,650 00

THE WORLD MARINE & GENERAL INSURANCE COMPANY, LIMITED.

Head Office—London, England.

Directors.

Sir Ivor Philipps, K.C.B., D.S.O., M.P., Chairman.

Herbert Ballard. A. R. Marshall.
Norman S. Douglass. J. Robertson.
John Godwin. The Hon. J. C. Maxwell Scott.
Sir John B. Wimble, K.B.E.

Irving H. Cortazzi, Secretary.

Capital authorized and subscribed £250,000
Amount paid up 100,000

STATEMENT FOR THE YEAR ENDED DECEMBER 31ST, 1921.

Assets.

		£	s.	d.
By Investments at cost		997,784	2	2
Due from other companies and agents		95,307	5	8
Outstanding premiums		21,598	17	6
Interest accrued but not payable		6,537	3	11
Cash—				
On deposit	£20,000 0 0			
In hand and on current account	7,408 1 1			
		27,408	1	1
Policy stamps in hand		509	4	2
Total assets		£1,149,144	14	6

Liabilities.

		£	s.	d.
To Capital authorized, 50,000 shares of £5 each = £250,000.				
Capital issued, 50,000 shares at £5 each, £2 paid		100,000	0	0
General Reserve Fund		200,000	0	0
Fire and General Insurance Fund		88,807	1	6
Marine Insurance Fund		395,357	6	6
Investment Reserve Fund		83,000	0	0
Profit and Loss Account		56,082	14	3
		£ 923,247	2	3
Claims admitted or intimated but not paid, fire and general		28,758	2	4
Outstanding charges and reserve for Government taxes		145,423	9	8
Due to other companies and agents		46,197	7	3
Unclaimed dividends		18	13	0
Reserve for bad debts		5,500	0	0
Total liabilities		£1,149,144	14	6

LIST OF COMPANIES LICENSED UNDER THE "BRITISH COLUMBIA FIRE INSURANCE ACT," DECEMBER 31ST, 1921.

Name of the Company and Head Office.	Attorney to receive Process in British Columbia. (Corrected to July 14th, 1921.)
The Acadia Fire Insurance Company, Halifax, N.S.	F. W. Rounsefell, Vancouver.
Aetna Insurance Company, Hartford, Conn.	J. E. Kinsman, Victoria.
Agricultural Insurance Company, Watertown, N.Y.	J. J. Banfield, Vancouver.
Alliance Assurance Company, Limited, London, England	W. A. Anderson and H. Miskin, Van-
Alliance Insurance Company of Philadelphia	C. N. Corwin, Vancouver. [couver.
American Alliance Insurance Company, New York, N.Y.	C. V. Wakely, Vancouver.
American Central Insurance Company, St. Louis, Missouri	D. W. Campbell, Victoria.
American Equitable Assurance Company of New York, N.Y.	C. G. Hobson, Vancouver.
Atlas Assurance Company, Limited, London, England	John S. Gall, Vancouver.
The Autocar Fire and Accident Insurance Company, Limited, London, England	R. Bone, Vancouver.
Beaver Fire Insurance Company, Winnipeg, Man.	Waghorn, Gwynn & Co., Ltd., Vancouver.
Boston Insurance Company, Boston, Mass.	E. C. Jahour, Vancouver.
British America Assurance Company, Toronto, Ontario	F. W. Rounsefell, Vancouver.
British Colonial Fire Insurance Company, Montreal, Que.	E. B. McDermid, Vancouver.
British Crown Assurance Corporation, Ltd., Glasgow, Scotland	A. S. Matthew, Vancouver.
The British General Insurance Co., Ltd., London, England	J. H. Gillespie, Victoria.
British North Western Fire Insurance Company, Toronto, Ont.	K. G. McCandless, Vancouver.
British Traders' Insurance Company, Ltd., Victoria, Hong Kong	C. R. Elderton, Vancouver.
Caledonian American Insurance Co., New York, N.Y.	Fred Burgess, Vancouver.
Caledonian Insurance Company, Edinburg, Scotland	Fred Burgess, Vancouver.
California Insurance Company, San Francisco, Cal.	A. W. Ross, Vancouver.
The Canada Accident and Fire Assurance Co., Montreal, Que.	A. W. Ross, Vancouver.
Canada National Fire Insurance Company, Winnipeg, Man.	R. W. Perry, Victoria.
Canada Security Assurance Co., Toronto, Ont.	J. J. Banfield, Vancouver.
The Canadian Indemnity Co., Winnipeg, Man.	A. McC. Creery, Vancouver.
Canadian Fire Insurance Company, Winnipeg, Man.	F. C. Paterson, Victoria.
‡The Canadian Surety Company, Toronto, Ont.	Wm. Savage, Vancouver.
Car & General Insurance Corporation, Limited, London, Eng.	J. H. Lawson, Vancouver.
The Century Insurance Company, Limited, Edinburgh, Scotland	Thos. W. Greer, Vancouver.
The China Fire Insurance Company, Ltd., Victoria, Hong Kong.	C. R. Elderton, Vancouver.
Citizens Insurance Company of Missouri, St. Louis, Mo.	Chas. H. Macaulay, Vancouver.
Columbia Insurance Co., Jersey City, N.J.	F. W. Rounsefell, Vancouver.
Commercial Union Assurance Company, Limited, London, England	A. W. Ross, Vancouver.
Commercial Union Fire Insurance Company of New York	A. W. Ross, Vancouver
Connecticut Fire Insurance Company, Hartford, Conn.	Robt. H. Swinerton, Victoria.
Continental Insurance Company, New York, N.Y.	W. A. Lawson, Vancouver.
Dominion Fire Insurance Company, Toronto, Ont.	G. H. L. Hobson, Vancouver.
The Dominion of Canada Guarantee & Accident Insurance Company, Toronto, Ont.	J. C. Stuart, Vancouver.
The Eagle, Star & British Dominions Insurance Co., Ltd., London, England.	R. J. Loewen and R. G. Harvey, Vancouver.
Employers Liability Assurance Corporation, Limited, London, Eng.	Jas. A. Young.
Equitable Fire & Marine Insurance Company, Providence, R.I.	C. V. Wakely, Vancouver.
The Essex and Suffolk Equitable Insurance Society, Ltd., London, England	John G. Elliott, Victoria.
Fidelity Phenix Fire Insurance Company, New York, N.Y.	Arthur Coles, Victoria.
Fire Association of Philadelphia, Philadelphia, Pa.	Leeming Bros., Ltd., Victoria.
The Fire Insurance Company of Canada, Montreal, Que.	C. G. Hobson, Vancouver.
Fireman's Fund Insurance Company, San Francisco, Cal.	E. D. Todd, Victoria.
Firemen's Insurance Company of Newark, New Jersey	C. B. Whitney, Vancouver.
The General Accident Assurance Company of Canada, Toronto, Ont.	George Rorie, Vancouver.
General Accident Fire & Life Assurance Corporation, Limited, Perth, Scotland	E. J. Enthoven, Vancouver.
General Fire Assurance Company, Paris, France	A. W. McLeod, Vancouver.
The Girard Fire & Marine Insurance Company, Philadelphia, Pa.	W. E. Martin, Vancouver.
Glens Falls Insurance Company, Glens Falls, N.Y.	A. S. Matthew, Vancouver.
Globe & Rutgers Fire Insurance Company, New York, N.Y.	A. McC. Creery, Vancouver.
The Globe Indemnity Co. of Canada, Montreal, Que.	F. W. Rounsefell, Vancouver.
Great American Insurance Company, New York, N.Y.	S. Burke, Vancouver.
Guardian Assurance Company, Limited, London, England	W. S. Day, Victoria.
The Guardian Insurance Company of Canada, Montreal, Que.	R. G. Heddle, Vancouver.
Hartford Fire Insurance Company, Hartford, Conn.	George Allan Kirk, Victoria.
Home Insurance Company, New York, N.Y.	H. W. Dyson, Vancouver.
Hudson Bay Insurance Company, Montreal, Que.	F. W. Walker, Vancouver.
†The Imperial Guarantee & Accident Insurance Company of Canada, Toronto, Ont.	Donald Cramer, Vancouver.
The Imperial Underwriters Corporation of Canada, Toronto, Ont.	A. Waring Giles, Vernon.
Insurance Company of North America, Philadelphia, Pa.	C. N. Corwin, Vancouver.
The Insurance Company of the State of Pennsylvania, Philadelphia, Pa.	H. A. Robertson, Vancouver.
Law, Union & Rock Insurance Company, Limited, London, England	A. W. Blake, Vancouver.
Liverpool & London & Globe Insurance Company, Limited, Liverpool, England	R. C. Hall, Victoria.
The Liverpool-Manitoba Assurance Company, Montreal, Que.	L. U. Convers, Victoria.
†The London & Lancashire Guarantee & Accident Company of Canada, Toronto, Ont.	A. W. Blake, Vancouver.
The London & Lancashire Insurance Company, Ltd., Liverpool, Eng.	A. W. Blake, Vancouver.
London Assurance Corporation, London, England	Harold B. Girdwood, Victoria.
London Guarantee & Accident Co., Ltd., London, England	R. C. Janion, Vancouver.
London Mutual Fire Insurance Company of Canada, Toronto, Ont.	Christopher G. Hobson, Vancouver.
The Marine Insurance Company, Limited, London, England	A. A. Meharey, Victoria.
Mechanics & Traders Insurance Company, New Orleans, La.	W. S. Holland, Vancouver.
Mercantile Fire Insurance Company, Waterloo, Ont.	A. W. Blake, Vancouver.
*Merchants Casualty Company, Winnipeg, Man.	J. B. Love, Vancouver.
Merchants Fire Assurance Corporation of New York, N.Y.	C. G. Hobson, Vancouver.

LIST OF COMPANIES LICENSED UNDER THE "BRITISH COLUMBIA FIRE INSURANCE ACT," DECEMBER 31ST, 1921—*Continued.*

Name of the Company and Head Office.	Attorney to receive Process in British Columbia. (Corrected to July 14th, 1921.)
The Merchants Marine Insurance Company, Limited, London, England	J. A. Young, Vancouver.
Millers National Insurance Company, Chicago, Ill.	C. G. Hobson, Vancouver.
The Motor Union Insurance Co., Ltd., London, England	W. W. Johnston, Vancouver.
The Mount Royal Assurance Company, Montreal, Que.	C. G. Hobson, Vancouver.
National Ben Franklin Fire Insurance Company, Pittsburgh, Pa.	J. H. Johnston, Victoria.
National Benefit Assurance Co., Ltd., London, England	Gordon Bell, Vancouver.
National Fire Insurance Company of Hartford, Hartford, Conn.	H. T. Barnes, Victoria.
The Nationale Fire Insurance Company, Paris, France	C. G. Hobson, Vancouver.
National Provincial Plate Glass & General Insurance Company, Limited, London, England	A. M. English, Vancouver.
National Union Fire Insurance Company, Pittsburgh, Pa.	E. E. Rand, Vancouver.
The Newark Fire Insurance Company, Newark, N.J.	F. W. Walker, Vancouver.
New Hampshire Fire Insurance Co., Manchester, N.H.	E. C. Jahour, Vancouver.
New Jersey Insurance Company, Newark, N.J.	H. A. Robertson, Vancouver.
Niagara Fire Insurance Company, New York, N.Y.	D. Leeming, Victoria.
§The North American Accident Insurance Co., Montreal, Que.	J. Edward Sears, Vancouver.
North British & Mercantile Insurance Company, Limited, London, England	H. R. Budd, Vancouver.
North Empire Fire Insurance Company, Winnipeg, Man.	John W. Wilson, Vancouver.
Northern Assurance Company, Limited, London, England	Bernard C. Mess, Victoria.
North West Fire Insurance Company, Winnipeg, Man.	Chas. H. C. Payne, Victoria.
Northwestern Mutual Fire Association, Seattle, Wash.	J. H. Constantine, Vancouver.
Northwestern National Insurance Company, Milwaukee, Wis.	W. B. Blane, Vancouver.
Norwich Union Fire Insurance Society, Limited, Norwich, Eng.	B. S. Heisterman, Victoria.
Occidental Fire Insurance Company, Winnipeg, Man.	B. C. Mess, Victoria.
The Ocean Accident & Guarantee Corporation, Limited, London, Eng.	John R. Hannah, Vancouver.
Pacific Coast Fire Insurance Company, Vancouver, B.C.	Thos. W. Greer, Vancouver.
The Pacific Marine Insurance Co., Vancouver, B.C.	Leslie H. Wright, Vancouver.
Palatine Insurance Company, Limited, London, England	A. W. Ross, Vancouver.
The Patriotic Assurance Company, Limited, Dublin, Ireland	E. V. K. Rankin, Vancouver.
The Phenix Fire Insurance Company of Paris, France	J. A. Griffith, Victoria.
Phoenix Assurance Company, Limited, London, England	F. W. Rounsefell, Vancouver.
The Phoenix Insurance Company, Hartford, Conn.	Arthur E. Haynes, Victoria.
Providence Washington Insurance Company, Providence, R.I.	R. B. Spears, Vancouver.
Provincial Insurance Co., Ltd., Bolton, England	W. B. Blane, Vancouver.
Quebec Fire Assurance Company, Quebec, Que.	A. W. Blake, Vancouver.
Queen Insurance Company of America, New York	Rithet Consolidated, Limited, Victoria.
Queensland Insurance Company, Limited, Sydney, Australia	C. Gardner-Johnson, Vancouver.
Railway Passengers Assurance Co., London, England	P. H. Grant, Vancouver.
Reliance Insurance Company of Canada, Montreal, Quebec	Chas. V. Wakely, Vancouver.
Royal Exchange Assurance, London, England	H. G. Lawson, Jr., Victoria.
Royal Insurance Company, Limited, Liverpool, England	F. W. Walker, Vancouver.
The Royal Scottish Insurance Co., Ltd., Glasgow, Scotland	J. H. Watson, Vancouver.
St. Paul Fire & Marine Insurance Company, St. Paul, Minn.	B. S. Heisterman, Victoria.
Scottish Canadian Assurance Corporation, Toronto, Ont.	A. W. McLeod, Vancouver.
Scottish Metropolitan Assurance Co., Ltd., Edinburgh, Scotland	Lawrence W. Peel, Vancouver.
Scottish Union & National Insurance Company, Edinburgh, Scotland	Pemberton & Son, Victoria.
Springfield Fire & Marine Insurance Company, Springfield, Mass.	Chas. H. Macaulay, Vancouver.
The Sterling Fire Insurance Company of Indiana, U.S.A.	H. R. Budd, Vancouver.
Stuyvesant Insurance Company, New York, N.Y.	H. A. Robertson, Vancouver.
Sun Insurance Office, London, England	F. B. Pemberton, Victoria.
The Traders & General Insurance Association, Ltd., London, Eng.	C. D. J. Christie, Vancouver.
Union Assurance Society, Limited, London, England	D. C. McGregor, Vancouver.
The Union Fire Insurance Company, Paris, France	Franco-Canadian Company, Limited, Vancouver.
‖Union Fire and Casualty Company, Winnipeg, Man.	Gordon Bell, Vancouver.
Union Insurance Society of Canton, Ltd., Victoria, Hong Kong	C. R. Elderton, Vancouver.
The Union Marine Insurance Company, Limited, Liverpool, England	C. H. Macaulay, Vancouver.
United States Fire Insurance Company, New York, N.Y.	H. A. Robertson, Vancouver.
Vulcan Fire Insurance Company of Oakland, Cal.	T. W. Greer, Vancouver.
¶The Wawanesa Mutual Insurance Co., Wawanesa, Man.	W. W. Kempton, Lumby.
Western Assurance Company, Toronto, Ont.	R. B. Spears, Vancouver.
Westchester Fire Insurance Company, New York, N.Y.	R. P. Clark, Victoria.
The Yang-tsze Insurance Association, Limited, Shanghai, China	B. G. D. Phillips, Vancouver.
The Yorkshire Insurance Company, Limited, York, England	H. W. Dyson, Vancouver.

‡ Licence under "B.C. Fire Insurance Act" limited to insurance of automobiles against fire; also licensed under the "Insurance Act" to transact guarantee, burglary, plate glass, and automobile insurance.

† Licence under "B.C. Fire Insurance Act," limited to insurance of automobiles against fire; also licensed under the "Insurance Act" to transact guarantee, accident, sickness, automobile, and plate-glass insurance.

* Licence under "British Columbia Fire Insurance Act" limited to insurance of automobiles against fire. Also licensed under "Insurance Act" to transact accident (excluding employers' liability, sickness, and automobile insurance.

§ Licence under "B.C. Fire Insurance Act," limited to insuring automobiles against loss or damage by fire; also licensed under the "Insurance Act" to transact automobile, burglary, accident, sickness, and plate-glass insurance.

‖ Deposit: Dominion War Loan bonds, $13,600; Toronto Harbour Commission bonds, $20,000. (Includes deposit under "Insurance Act.")

¶Deposit: Dominion War Loan bonds, $25,000.

NOTE.—Licensed since December 31st, 1921:—

Baloise Fire Insurance Company, Basle, Switzerland; A. S. Matthew, Vancouver.
The British Oak Insurance Company, Limited, London, England; H. A. Robertson, Vancouver.
Ensign Insurance Company, Toronto, Ont.; Wm. B. Blane, Vancouver.
Security Insurance Company of New Haven, Conn.; T. W. Greer, Vancouver.
United British Insurance Company, Limited, London, England; B. S. Brown, Vancouver.

Name of Company and Head Office.	Attorney to receive Process in British Columbia. (Corrected to July 14th, 1921.)	Description of Insurance Business for which Licensed. (Corrected to July 14th, 1921.)
Ætna Insurance Co., Hartford, Conn.	J. E. Kinsman, Victoria	*Automobile, marine, tornado, and inland transportation.
Ætna Life Insurance Co., Hartford, Conn.	John F. Brandt, Vancouver	Life.
Alliance Assurance Co., Ltd., London, Eng.	W. Anderson and H. Miskin, Vancouver	*Marine, accident, sickness, guarantee, automobile, burglary, plate glass, and hail.
Alliance Insurance Co. of Philadelphia, Pa.	C. N. Corwin, Vancouver	*Marine, automobile (excluding insurance against loss by reason of injury to the person), and inland transportation.
American Alliance Insurance Co., New York, N.Y.	C. V. Wakely, Vancouver	*Automobile (excluding insurance against loss by reason of injury to the person).
American Central Insurance Company, St. Louis, Mo.	D. W. Campbell, Victoria	*Automobile, explosion (including riot and civil commotion) and tornado.
The Boiler Inspection & Insurance Co. of Canada, Toronto, Ont.	R. V. Winch & Co., Ltd., Vancouver	Steam-boiler.
Boston Insurance Co., Boston, Mass.	E. C. Jahour, Vancouver	*Marine.
British America Assurance Co., Toronto, Ont.	F. W. Rounsefell, Vancouver	*Hail, ocean, marine, inland marine, inland transportation, and automobile.
The British and Foreign Marine Insurance Co., Ltd., Liverpool, Eng.	B. C. Mess, Victoria	Marine, inland transportation, and sprinkler leakage.
(1.) The British Columbia Plate Glass Insurance Co., Vancouver, B.C.	Head Office, Vancouver	Plate glass.
The British Crown Assurance Corporation, Ltd., Glasgow, Scotland	A. S. Matthew, Vancouver	*Automobile (excluding insurance against loss by reason of bodily injury to the person).
British Traders Insurance Co., Ltd., Victoria, Hong Kong	C. R. Elderton, Vancouver	*Automobile and marine.
The Canada Accident and Fire Assurance Co., Montreal, Que.	A. W. Ross, Vancouver	*Accident, sickness, plate glass, guarantee, burglary, and automobile.
Canada Life Assurance Co., Toronto, Ont.	F. W. Marsh, Vancouver	Life.
Canada Security Assurance Company, Toronto, Ont.	J. J. Banfield, Vancouver	*Automobile.
Canadian Fire Insurance Company, Winnipeg, Man.	F. C. Paterson, Victoria	Automobile.
The Canadian Surety Co., Toronto, Ont.	William Savage, Vancouver	Guarantee, burglary, plate glass, and automobile. (Also licensed under "B.C. Fire Insurance Act" to insure automobiles against loss or damage by fire.)
The Canton Insurance Office, Limited, Victoria, Hong Kong	Wise & Co., Ltd., Victoria	Marine.
The Capital Life Assurance Co. of Canada, Ottawa, Ont.	W. D. Kennedy, Vancouver	Life.
Car and General Insurance Corporation, Ltd., London, Eng.	J. R. Lavis, Vancouver	*Accident, hail, automobile, and sickness.
Columbia Insurance Company, Jersey City, N.J.	F. W. Rounsefell, Vancouver	*Automobile (excluding insurance against loss by reason of bodily injury to the person) and inland transportation.
Commercial Union Assurance Company, Limited, London, Eng.	A. W. Ross, Vancouver	Life.
Confederation Life Association, Toronto, Ont.	J. R. Glass, Vancouver	Life.
Continental Casualty Co., Hammond, Ind.	A. S. Matthew, Vancouver	Accident, sickness, and automobile.
Continental Insurance Company, New York, N.Y.	W. A. Lawson, Vancouver	*Tornado, explosion (including riot and civil commotion), and automobile (excluding insurance against loss by reason of bodily injury to the person).
The Continental Life Insurance Co., Toronto, Ont.	James Moss, Victoria	Life.
The Crown Life Insurance Co., Toronto, Ont.	C. R. McD. Russell, Vancouver	Life.
Dominion Gresham Guarantee & Casualty Co., Montreal, Que.	R. S. Day, Vancouver	Accident, sickness, guarantee, burglary, and automobile.
The Dominion Life Assurance Co., Waterloo, Ont.	N. T. Truell, Vancouver	Life.
The Dominion of Canada Guarantee & Accident Ins. Co., Toronto, Ont.	F. C. Stuart, Vancouver	*Accident, guarantee, sickness, burglary, and plate glass.
The Eagle Star & British Dominions Insurance Co., Ltd., London, Eng.	R. J. Loewen and R. G. Harvey, Vancouver	*Marine and automobile (limited to insurance against loss or damage from accident or injury suffered by an employee or other person caused by the automobile for which the owner is liable).
Employers Liability Assurance Corporation, Ltd., London, Eng.	Jas. A. Young, Vancouver	*Accident, sickness, guarantee, automobile, burglary, steam-boiler, and robbery.
Equitable Fire & Marine Insurance Co., Providence, R.I.	C. V. Wakely, Vancouver	Automobile (excluding insurance against loss by reason of bodily injury to the person).
The Excelsior Life Insurance Co., Toronto, Ont.	F. J. Gillespie, Vancouver	Life.
The Fidelity & Casualty Co., New York, N.Y.	Seeley & Co., Vancouver	Accident, sickness, burglary, steam-boiler, and plate glass.
Fidelity Phenix Fire Insurance Co., New York, N.Y.	Arthur Coles, Victoria	*Tornado, explosion (including riot and civil commotion), and automobile (excluding insurance against loss by reason of bodily injury to the person).
Fireman's Fund Insurance Co., San Francisco, Cal.	E. D. Todd, Victoria	*Marine, inland transportation, and automobile (excluding insurance against loss by reason of bodily injury to the person).
Firemen's Insurance Co. of Newark, N.J.	O. B. Whitney, Vancouver	*Marine.
General Accident Assurance Co. of Canada, Toronto, Ont.	W. F. Sangster, Vancouver	*Accident, sickness, steam-boiler, guarantee, automobile, burglary, and insurance against loss or damage by robbery.
General Accident Fire & Life Assurance Corpn., Ltd., Perth, Scotland	E. J. Enthoven, Vancouver	Automobile (excluding insurance against loss by reason of bodily injury to the person).
The General Animals Insurance Co. of Canada, Montreal, Que.	A. S. Matthews, Vancouver	Live stock and plate glass.
Glens Falls Insurance Co., Glens Falls, N.Y.	A. S. Matthews, Vancouver	Hail, tornado, automobile, explosion (including riot and civil commotion) and inland transportation.
Globe & Rutgers Fire Insurance Co., New York, N.Y.	A. McC. Creery, Vancouver	Inland transportation. Automobile (excluding insurance against loss by reason of bodily injury to the person), explosion (except upon steam-boilers, pipes, fly-wheels, engines, and machinery connected therewith or operated thereby), and marine.
The Globe Indemnity Co. of Canada, Montreal, Que.	F. W. Rounsefell, Vancouver	Accident, sickness, burglary, automobile, guarantee, and forgery.
Great American Insurance Co., New York, N.Y.	S. Burke, Vancouver	Hail, tornado, sprinkler leakage, marine, automobile (excluding insurance against loss by reason of bodily injury), explosion (including riot and civil commotion), and inland transportation.
The Great West Life Assurance Co., Winnipeg, Man.	J. A. Johnson, Vancouver	Life.
The Guarantee Company of North America, Montreal, Que.	A. Holland, Victoria	Guarantee.
The Guardian Insurance Co. of Canada, Montreal, Que.	W. E. Graveley, Vancouver	Accident, sickness, automobile, burglary, guarantee, live stock, plate glass, and sickness.
Hartford Accident and Indemnity Company, Hartford, Conn.	H. R. Budd, Vancouver	*Hail, explosion (including riot and civil commotion), inland transportation, cyclone or tornado, sprinkler leakage, and insurance against loss caused by rain, tempest, flood, or other climatic conditions, except loss of or damage to property caused by hail, windstorm, cyclone, or tornado.
Hartford Fire Insurance Co., Hartford, Conn.	A. A. Kirk, Victoria	
Home Insurance Co., New York, N.Y.	H. W. Dyson, Vancouver	*Automobile, sprinkler leakage, hail, tornado, explosion (including riot and civil commotion), burglary, property damage, inland transportation, and insurance against loss or damage by rain or flood.
The Imperial Guarantee & Accident Insurance Co. of Canada, Toronto, Ont.	D. Cramer, Vancouver	Guarantee, accident, sickness, automobile, and plate glass. (Also licensed under "B.C. Fire Insurance Act" to transact the business of insurance of automobiles against fire.)
The Imperial Life Assurance Co. of Canada, Toronto, Ont.	Stanley Henderson, Vancouver	Life.
Insurance Company of North America, Philadelphia, Pa.	C. N. Corwin, Vancouver	*Inland transportation, automobile (excluding injury to the person), marine, and explosion (including riot and civil commotion).
Law, Union & Rock Insurance Co., Ltd., London, Eng.	A. W. Blake, Vancouver	Accident, sickness, burglary, plate glass, and automobile.
The Law Union and Crown Insurance Company, Montreal, Que.	R. U. Conyers, Victoria	Explosion (including riot and civil commotion) and automobile.
The London & Lancashire Guarantee & Accident Co. of Canada, Toronto, Ont.	A. W. Blake, Vancouver	Accident, sickness, guarantee, plate glass, automobile, burglary, and insurance against loss or damage occasioned by larceny, theft, or stealing from the person by violence, threat, hold-up or otherwise.
The London & Lancashire Insurance Co., Ltd., Liverpool, England	A. W. Blake, Vancouver	*Marine, automobile, and explosion (including riot and civil commotion).
London & Provincial Marine & General Insurance Co., Ltd., London, Eng.	R. V. Winch & Co., Ltd., Victoria	Marine.
The London & Scottish Assurance Corporation, Limited, London, Eng.	Lawrence W. Peel, Vancouver	Life.
London Assurance Corporation, London, Eng.	R. V. Winch & Co., Ltd., Victoria	Marine, automobile, inland marine, and inland transportation.
London Guarantee & Accident Co., Ltd., London, Eng.	J. H. Wright, Vancouver	Accident, sickness, guarantee, and burglary.
London Mutual Fire Insurance Company of Canada, Toronto, Ont.	C. G. Hobson, Vancouver	Automobile.
The London Life Insurance Co., London, Ont.	William B. Ryan, Victoria	Life.
Royal Protective Insurance Co., Boston, Mass.	G. H. Grant, Vancouver	Accident and sickness amongst members of I.O.O.F.
Lumbermen's Mutual Casualty Company, Chicago, Ill.	F. H. Constantine, Vancouver	Automobile.
The Manufacturers Life Insurance Co., Toronto, Ont.	W. B. Barwis, Vancouver	Life.
The Marine Insurance Co., Ltd., London, Eng.	A. A. Sabarton, Victoria	Inland transportation, automobile, marine, and inland marine.
Maritime Insurance Co., Ltd., London, Eng.	Rithet Consolidated, Limited, Victoria	Marine.
Maryland Casualty Co., Baltimore, Maryland	A. T. Barnes, Victoria	Accident, burglary, guarantee, plate glass, steam-boiler, sickness, forgery, fly-wheel, sprinkler leakage, and insurance against loss or damage by robbery.
Merchants Casualty Co., Winnipeg, Man.	J. B. Love, Vancouver	Accident (excluding employers' liability), sickness, and automobile.
The Merchants Marine Insurance Co., Ltd., London, England	James A. Young, Vancouver	*Automobile.
Metropolitan Life Insurance Co., New York, N.Y.	C. Winterborne, Victoria	Life.
The Monarch Life Assurance Co., Winnipeg, Man.	R. W. Hills, Vancouver	Life.
The Motor Union Insurance Company, Limited, London, Eng.	W. W. Johnston, Vancouver	*Accident, automobile, and marine.
Mutual Life Assurance Co. of Canada, Waterloo, Ont.	W. J. Twiss, Vancouver	Life.
The Mutual Life Insurance Co. of New York, N.Y.	A. G. Smith, Vancouver	Life.
National Benefit Assurance Company, Limited, London, Eng.	Gordon Bell, Vancouver	Life.
National Fire Insurance Co. of Hartford, Hartford, Conn.	A. T. Barnes, Victoria	Marine, accident, sickness, hail, and automobile.
National Life Assurance Co. of Canada, Toronto, Ont.	Lindley Crease, Victoria	Tornado, explosion (including riot and civil commotion), inland transportation, marine, and automobile (excluding insurance against loss by reason of bodily injury to the person)
National Provincial Plate Glass & General Insurance Co., Ltd., London, Eng.	F. W. Rounsefell, Vancouver	Life.
National Surety Co., New York, N.Y.	R. V. Winch, Vancouver	Plate glass.
The Newark Fire Insurance Co., Newark, N.J.	F. W. Walker, Vancouver	Guarantee, burglary, and forgery.
New Jersey Insurance Company, Newark, N.J.	H. A. Robertson, Vancouver	Marine and automobile (excluding insurance against loss by reason of injury to the person) and marine.
New York Life Insurance Co., New York, N.Y.	M. H. Garwood, Vancouver	*Automobile (excluding insurance against loss by reason of injury to the person) and marine.
The New York Plate Glass Insurance Co., New York, N.Y.	A. S. Matthew, Vancouver	Life.
New Zealand Insurance Company, Ltd., Auckland, New Zealand	J. T. Summerfield, Vancouver	Plate glass.
Niagara Fire Insurance Co., New York, N.Y.	D. Leeming, Victoria	Marine.
The North American Accident Insurance Co., Montreal, Que.	J. E. Sears, Vancouver	Tornado, automobile (including damage to automobiles in transit by rail), marine, and explosion (including riot and civil commotion).
North American Life Assurance Co., Toronto, Ont.	Hills & Peters, Vancouver	Accident, sickness, plate glass, automobile, and burglary.
Northern Assurance Company, Ltd., London, Eng.	R. V. Winch & Co., Ltd., Vancouver	Life.
The Northern Life Assurance Co. of Canada, London, Ont.	W. H. Clarke, Vancouver	Marine, accident, sickness, automobile, guarantee, and plate glass.
Northwestern Mutual Fire Association, Seattle, Wash.	F. H. Constantine, Vancouver	Life.
Northwestern National Insurance Co., Milwaukee, Wis.	W. B. Blane, Vancouver	Automobile (excluding insurance against loss by reason of bodily injury to the person).
Norwich Union Fire Insurance Society, Ltd., Norwich, Eng.	S. B. Heisterman, Victoria	*Automobile.
Norwich Union Life Insurance Society, Norwich, Eng.	S. B. Heisterman, Victoria	Accident, sickness, plate glass, automobile.
Occidental Fire Insurance Company, Winnipeg, Man.	B. C. Mess, Victoria	Life.
The Ocean Accident & Guarantee Corporation, Ltd., London, Eng.	J. R. Lavis, Vancouver	*Automobile.
Ocean Marine Insurance Co., Ltd., London, Eng.	R. V. Winch & Co., Ltd., Victoria	Accident, sickness, guarantee, plate glass, automobile, and burglary.
The Pacific Marine Insurance Company, Vancouver, B.C.	L. H. Wright, Vancouver	Marine.
The Palatine Insurance Company, Limited, London, Eng.	A. W. Ross, Vancouver	Automobile and inland transportation.
Phœnix Assurance Co., Ltd., London, Eng.	F. W. Rounsefell, Vancouver	Automobile.
The Phœnix Insurance Co., Hartford, Conn.	A. E. Haynes, Victoria	*Life.
The Preferred Accident Insurance Company of New York, N.Y.	J. S. Gall, Vancouver	Marine and automobile (excluding insurance against loss by reason of injury to the person).
The Protective Association of Canada, Granby, Que.	F. G. Bell, Vancouver	Accident, sickness, and automobile.
The Prudential Insurance Co. of America, Newark, N.J.	W. G. Hagensen, Vancouver	Accident and sickness restricted to members of the Masonic Order.
Queen Insurance Co. of America, New York, N.Y.	Rithet Consolidated, Limited, Victoria	Life.
Queensland Insurance Co., Ltd., Sydney, Australia	C. Gardiner Johnson, Vancouver	Automobile, inland transportation, and marine.
Railway Passengers Assurance Co., London, Eng.	P. H. Gent, Vancouver	Marine.
Reliance Marine Insurance Co., Limited, Eng.	Rithet Consolidated, Limited, Victoria	Accident, sickness, and guarantee.
The Ridgely Protective Association, Worcester, Mass.	John Dunlop, Nelson	Marine.
Royal Exchange Assurance, London, Eng.	H. G. Lawson, jr., Victoria	Accident and sickness amongst members of I.O.O.F.
Royal Insurance Co., Ltd., Liverpool, Eng.	F. W. Walker, Vancouver	Accident, sickness, and automobile.
(2.) Royal Plate Glass Insurance Company of Canada, Vancouver, B.C.	Head Office, Vancouver	Life and marine.
St. Paul Fire & Marine Insurance Co., St. Paul, Minn.	B. S. Heisterman, Victoria	Plate glass.
Scottish Metropolitan Assurance Corporation, Limited, Edinburgh, Scotland	Lawrence W. Peel, Vancouver	Automobile, inland transportation, and marine.
Scottish Union & National Insurance Co., Edinburgh, Scotland	F. B. Pemberton, Victoria	Accident, sickness, guarantee, automobile, marine, and inland marine.
The Sovereign Life Assurance Co., Winnipeg, Man.	M. D. McPherson, Vancouver	Tornado, sprinkler leakage, and automobile.
The Standard Life Assurance Co., Edinburgh, Scotland	J. W. Kerr, Vancouver	Life.
Standard Marine Insurance Co., Ltd., Liverpool, Eng.	C. Gardiner Johnson, Vancouver	Life.
The Sterling Fire Insurance Company of Indiana, Indianapolis, Ind.	J. R. Budd, Vancouver	Marine.
Sun Life Assurance Co. of Canada, Montreal, Que.	H. O. Leach, Vancouver	Tornado and automobile.
Tokio Marine & Fire Insurance Co., Limited, Tokio, Japan	B. G. D. Phillips, Vancouver	Life.
The Travelers Indemnity Company, Hartford, Conn.	A. E. Hall, Victoria	Marine
The Travelers Insurance Co., Hartford, Conn.	R. C. Hall, Victoria	Accident, sickness, steam-boiler, plate glass, burglary, automobile, and fly-wheel.
Travellers Life Assurance Co. of Canada, Montreal, Que.	J. D. Mather, Vancouver	Life and accident.
Union Assurance Society, Limited, London, England	Chas. R. Bishop, Victoria	Life.
(3) Union Fire and Casualty Company, Winnipeg, Man.	Gordon Bell, Vancouver	*Automobile.
Union Insurance Society of Canton, Ltd., Victoria, Hong Kong	C. R. Elderton, Vancouver	*Accident, sickness, and automobile.
The Union Marine Insurance Company, Ltd., Liverpool, Eng.	C. H. Macaulay, Vancouver	*Marine, automobile, accident, sickness, inland transportation, and insurance against damage to property of any kind caused by the explosion of natural or coal gas.
Union Mutual Life Insurance Co., Portland, Maine	Viggo F. Laursen, Vancouver	Marine, inland marine, inland transportation, and automobile (excluding insurance against loss by reason of bodily injury to the person).
United States Fidelity & Guaranty Co., Baltimore, Md.	Leslie H. Wright, Vancouver	Life.
United States Fire Insurance Co., New York, N.Y.	H. A. Robertson, Vancouver	Guarantee, accident, sickness, burglary, plate glass, steam-boiler, and robbery.
United States Lloyds, Inc., New York, N.Y.	B. G. D. Phillips, Vancouver	*Automobile (excluding insurance against loss by reason of injury to the person and explosion (including riot and civil commotion).
Western Assurance Company, Toronto, Ont.	R. B. Spears, Vancouver	Marine.
The Western Casualty Company, Denver, Col.	W. H. Biegel, Vancouver	*Marine, inland transportation, explosion (including riot and civil commotion), tornado, and automobile.
(4) The Western Empire Life Assurance Co., Winnipeg, Man.	C. Wilson, Vancouver	Accident and sickness.
The Western Life Assurance Co., Winnipeg, Man.	C. E. Mahon, Vancouver	Life.
Westchester Fire Insurance Co., New York, N.Y.	R. P. Clark, Victoria	Life.
The World Marine & General Insurance Co., Ltd., London, Eng.	B. C. Mess, Victoria	*Explosion (including riot and civil commotion).
The Yang-tsze Insurance Association, Ltd., Shanghai, China	B. G. D. Phillips, Vancouver	Marine.
The Yorkshire Insurance Co., Ltd., York, Eng.	H. W. Dyson, Vancouver	*Accident, sickness, plate glass, and live stock.

* Also licensed under "B.C. Fire Insurance Act" to transact fire insurance.

Securities (par value) deposited under the Act:—
(1.) War Loan Bonds, $1,000; Municipal Securities, $5,000; B.C. Inscribed Stock, $973.32.
(2.) Dominion War Loan Bonds, $5,000, and deposit receipt, Canadian Bank of Commerce, $125.
(3.) Dominion War Loan Bonds, $15,000; Toronto Harbour Commission Bonds, $20,000. (Includes deposit under "B.C. Fire Insurance Act.")
(4.) Dominion War Loan Bonds, $27,000.

NOTE.—Licensed since December 31st, 1921:—
The Casualty Company of Canada, Toronto, Ont.: Gordon Bell, Vancouver; automobile, burglary, and plate glass.
Fidelity Insurance Company of Canada, Toronto, Ont.; Robert E. Brett, Victoria; guarantee.
Imperial Underwriters Corporation of Canada, Toronto, Ont.; A. Waring Giles, Vernon; accident, automobile, guarantee, and sickness.
Sun Insurance Office, London, England; F. B. Pemberton, Victoria; accident, automobile, guarantee, and sickness.

TABLE I.—NET FIRE INSURANCE PREMIUMS AND NET LOSSES, 1921.

Name of Company.	Net Premiums.	Net Amount of Losses incurred.	Net Amount of Losses paid.
The Acadia Fire Insurance Co	$ 32,379 31	$ 7,340 93	$ 4,065 27
Aetna Fire Insurance Co	59,634 58	19,264 96	19,886 15
Agricultural Insurance Co	18,311 98	1,486 68	2,565 07
Alliance Assurance Co., Ltd	31,314 80	1,235 47	1,075 67
Alliance Insurance Co. of Philadelphia	32,251 95	24,262 90	19,527 90
American Alliance Insurance Co	5,503 69	1,137 52	1,138 52
American Central Insurance Co	30,670 54	4,503 08	6,972 32
American Equitable Assurance Co. of N.Y	9,652 36	1,226 95	1,226 95
Atlas Assurance Co., Ltd	37,956 55	4,056 34	4,056 34
The Autocar Fire & Accident Insurance Co., Ltd	3,137 97	*Nil.*	*Nil.*
Beaver Fire Insurance Co	7,474 29	654 75	299 75
Boston Insurance Co	34,044 65	15,875 76	19,685 88
British America Assurance Co	61,306 45	27,480 91	28,885 91
British Colonial Fire Insurance Co	16,368 21	13,310 61	13,306 36
British Crown Assurance Corporation, Ltd	92,614 08	154,669 00	149,187 89
British General Insurance Co., Ltd	12,203 25	349 45	1,560 45
British Northwestern Fire Insurance Co	17,665 30	5,739 18	5,513 55
British Traders Insurance Co., Ltd	34,194 75	17,440 30	15,435 30
Caledonian American Insurance Co	15,582 06	1,574 52	1,234 52
Caledonian Insurance Co	51,940 09	7,943 58	6,959 13
California Insurance Co	30,631 88	10,998 70	6,903 57
The Canada Accident & Fire Assurance Co	25,924 29	8,698 18	9,746 86
Canada National Fire Insurance Co	31,153 83	3,294 93	3,004 93
Canada Security Assurance Co	11,747 75	2,757 10	2,578 35
The Canadian Indemnity Co	8,572 61	24 43	694 04
Canadian Fire Insurance Co	31,994 61	4,116 18	4,039 09
The Canadian Surety Co	1,937 41	764 72	669 54
Car & General Insurance Corporation, Ltd	15,048 12	102 11	97 11
The Century Insurance Co., Ltd	35,957 96	6,285 05	11,935 99
The China Fire Insurance Co., Ltd	7,986 27	2,720 83	4,314 42
Citizens Insurance Co. of Missouri	36,384 53	17,168 93	17,027 93
Columbia Insurance Co. of N.J	21,070 95	2,941 94	2,764 52
Commercial Union Assurance Co., Ltd	88,551 54	39,218 51	40,716 51
Commercial Union Fire Insurance Co. of N.Y	7,353 97	2,492 00	2,551 50
Connecticut Fire Insurance Co	36,782 78	5,998 39	4,931 89
Continental Insurance Co	47,175 24	57,402 03	57,149 52
Dominion Fire Insurance Co	22,960 98	7,633 25	7,528 60
Dominion of Canada Guarantee & Accident Insurance Co	5,099 72	*Nil.*	969 50
Eagle Star & British Dominions Insurance Co., Ltd	50,706 01	16,848 19	13,572 25
Employers Liability Assurance Corporation, Ltd	47,082 77	16,272 45	14,832 87
Equitable Fire & Marine Insurance Co	7,292 82	860 37	904 68
Essex & Suffolk Equitable Insurance Society, Ltd	6,521 93	290 12	290 12
Fidelity Phenix Fire Insurance Co	66,432 46	64,227 34	61,176 98
Fire Association of Philadelphia	20,059 96	7,920 48	7,094 19
The Fire Insurance Co. of Canada	22,455 25	3,405 03	3,405 03
Fireman's Fund Insurance Co	45,158 47	22,528 39	23,005 73
Firemen's Insurance Co. of Newark	9,572 99	1,050 37	14,920 20
General Accident Assurance Co. of Canada	12,844 62	1,274 73	1,274 73
The General Accident Fire & Life Assurance Corporation, Ltd	18,298 86	1,019 87	1,819 26
General Fire Assurance Co. of Paris, France	12,583 61	6,201 38	7,519 38
The Girard Fire & Marine Insurance Co	3,092 79	55 50	55 50
Glens Falls Insurance Co	11,149 38	2,834 47	3,825 47
Globe & Rutgers Fire Insurance Co	41,093 32	106,870 25	105,471 09
The Globe Indemnity Co. of Canada	36,877 40	20,692 07	17,462 07
Great American Insurance Co	44,137 96	17,821 76	15,083 76
Guardian Assurance Co., Ltd	118,372 29	42,960 63	40,710 63
The Guardian Insurance Co. of Canada	14,053 32	3,972 91	3,972 91
Hartford Fire Insurance Co	112,524 27	123,699 73	107,242 53
Home Insurance Co	127,218 31	111,670 87	101,879 87
Hudson Bay Insurance Co	42,624 53	10,800 51	12,216 51
Imperial Guarantee & Accident Insurance Co. of Canada	2,455 77	8,480 13	4,818 11
Imperial Underwriters Corporation of Canada	50,513 32	13,844 37	15,629 56
Insurance Co. of North America	82,047 01	61,146 89	57,916 89
The Insurance Co. of the State of Pennsylvania	30,292 83	12,437 94	14,290 99
Law, Union & Rock Insurance Co., Ltd	22,637 38	5,020 85	5,020 85
Liverpool & London & Globe Insurance Co., Ltd	175,392 39	49,469 25	61,256 25
The Liverpool-Manitoba Assurance Co	50,681 79	32,652 52	45,917 52
The London & Lancashire Guarantee & Accident Co. of Canada	7,273 56	5,627 98	5,627 98
Carried forward	$2,361,988 67	$1,254,181 32	$1,248,539 05

TABLE I.—NET FIRE INSURANCE PREMIUMS, ETC.—*Continued.*

Company.	Net Premiums.	Net Amount of Losses incurred.	Net Amount of Losses paid.
Brought forward	$2,361,988 67	$1,254,181 32	$1,248,539 05
London & Lancashire Insurance Co., Ltd	96,651 83	32,944 07	29,549 07
London Assurance Corporation	85,304 02	19,258 18	19,260 18
London Guarantee & Accident Co., Ltd	44,458 25	42,301 36	51,152 36
London Mutual Fire Insurance Co. of Canada	43,122 29	21,870 46	21,947 46
The Marine Insurance Co., Ltd	1,016 27	870 60	870 60
Mechanics & Traders Insurance Co	22,544 89	19,601 47	17,218 87
Mercantile Fire Insurance Co	28,370 95	7,635 48	7,790 48
Merchants Casualty Co	640 55	415 90	415 90
Merchants Fire Assurance Corporation of N.Y	29,955 06	2,903 23	5,010 43
The Merchants Marine Insurance Co., Ltd	17,128 39	4,011 60	4,011 60
Millers National Insurance Co	6,587 00	1,946 15	1,946 15
The Motor Union Insurance Co., Ltd	4,836 30	*Nil.*	*Nil.*
The Mount Royal Assurance Co	63,965 46	5,691 12	7,630 12
National Ben Franklin Fire Insurance Co	22,145 22	8,309 02	5,971 53
National Benefit Assurance Co., Ltd	3,569 41	323 79	291 29
National Fire Insurance Co. of Hartford	66,883 67	114,936 10	112,120 10
The Nationale Fire Insurance Co., Paris	44,078 04	12,915 62	11,747 62
National Provincial Plate Glass & General Insurance Co., Ltd	3,910 80	2 55	2 55
National Union Fire Insurance Co	22,503 07	6,214 29	6,156 47
Newark Fire Insurance Co	16,707 30	4,252 65	3,198 65
New Hampshire Fire Insurance Co	9,666 69	8,000 15	8,970 60
New Jersey Insurance Co	21,931 54	9,448 86	11,242 85
Niagara Fire Insurance Co	33,024 24	10,676 94	8,426 94
North American Accident Insurance Co	396 91	553 06	553 06
North British & Mercantile Insurance Co	70,563 21	9,041 83	8,900 33
North Empire Fire Insurance Co	27,857 69	16,519 09	16,519 09
Northern Assurance Co., Ltd	96,494 66	26,567 93	26,733 93
North West Fire Insurance Co	10,998 50	3,649 25	3,626 35
Northwestern Mutual Fire Association	103,660 57	56,231 08	74,812 02
Northwestern National Insurance Co	52,163 86	7,715 36	8,364 01
Norwich Union Fire Insurance Society, Ltd	101,984 08	29,969 16	27,211 70
Occidental Fire Insurance Co	9,290 97	8,556 58	4,060 56
The Ocean Accident & Guarantee Corporation, Ltd	8,063 80	2,249 50	2,549 50
Pacific Coast Fire Insurance Co	43,809 22	5,372 87	6,719 99
The Pacific Marine Insurance Co	13,096 35	9,817 62	8,992 62
Palatine Insurance Co., Ltd	36,819 36	10,275 88	9,030 88
The Patriotic Assurance Co., Ltd	1,694 34	*Nil.*	*Nil.*
The Phenix Fire Insurance Co. of Paris	15,934 24	8,158 51	9,480 51
Phoenix Assurance Co., Ltd	227,506 98	52,391 70	85,399 77
The Phoenix Insurance Co. of Hartford	43,979 82	15,624 48	17,419 48
Providence Washington Insurance Co	23,029 56	10,846 69	13,812 65
Provincial Insurance Co., Ltd	19,243 66	2,281 19	2,281 19
Quebec Fire Assurance Co	23,719 95	984 58	849 58
Queen Insurance Co. of America	82,933 15	21,240 52	20,907 52
Queensland Insurance Co., Ltd	16,439 07	3,970 46	4,200 93
Railway Passengers Assurance Co	3,138 89	120 38	120 38
Reliance Insurance Co. of Canada	3,512 98	11 00	11 02
Royal Exchange Assurance	33,032 16	3,460 71	3,270 71
Royal Insurance Co., Ltd	121,657 62	59,975 69	54,522 69
The Royal Scottish Insurance Co., Ltd	17,988 91	8,408 76	9,302 76
St. Paul Fire & Marine Insurance Co	27,932 46	2,125 55	4,756 83
Scottish Canadian Assurance Corporation	11,515 16	4,604 17	4,604 17
Scottish Metropolitan Assurance Co., Ltd	31,091 23	3,202 83	3,040 71
Scottish Union & National Insurance Co	45,030 64	29,799 88	21,954 88
Springfield Fire & Marine Insurance Co	54,470 73	12,079 44	8,128 60
The Sterling Fire Insurance Co	1,203 42	*Nil.*	*Nil.*
Stuyvesant Insurance Co	14,929 30	2,679 56	6,052 49
Sun Insurance Office	72,913 88	27,402 61	23,473 88
The Traders & General Insurance Association, Ltd	11,634 21	42 48	56 67
Union Assurance Society, Ltd	49,781 08	9,016 28	9,538 47
The Union Fire & Casualty Co	6,465 66	*Nil.*	*Nil.*
Union Fire Insurance Co. of Paris, France	21,869 91	4,828 68	4,402 36
Union Insurance Society of Canton, Ltd	51,268 10	14,613 71	15,093 71
The Union Marine Insurance Co., Ltd	3,051 04	3,552 13	3,552 13
United States Fire Insurance Co	12,779 94	8,442 70	8,442 70
Vulcan Fire Insurance Co. of Oakland	10,100 38	1,788 32	3,325 82
The Wawanesa Mutual Insurance Co	6,840 24	13,403 15	13,403 15
Western Assurance Co	57,217 39	22,128 08	22,082 71
Westchester Fire Insurance Co	20,996 93	7,706 45	8,547 51
The Yang-tsze Insurance Association, Ltd	9,658 30	116 54	116 54
The Yorkshire Insurance Co., Ltd	29,659 36	4,567 67	5,272 67
Total	$4,810,405 78	$2,134,251 22	$2,168,851 76

TABLE II.—FIRE INSURANCE SUMMARY.

Year.	Net Premiums.	Net Amount of Losses incurred.	Net Amount of Losses paid.
1917	$ 3,609,442 65	$ 887,629 01	$ 958,460 60
1918	4,085,219 68	1,214,162 65	1,120,475 80
1919	4,370,432 98	1,259,983 28	1,181,196 47
1920	5,427,798 35	1,636,148 83	1,648,167 47
1921	4,810,405 78	2,134,251 22	2,168,851 76
Totals	$22,303,299 44	$7,132,184 99	$7,077,152 10

TABLE III.—DISPOSITION OF PREMIUMS RECEIVED.

	1918.	1919.	1920.	1921.
Rate of losses paid per cent. of premiums received	53.84	41.67	43.40	58.28
Rate of dividend or bonus to stockholders per cent. of premiums received (Canadian companies only)	2.79	4.74	....	....
Rate of general expenses per cent. of premiums received	35.61	36.56	....	....
Rate of premiums charged per cent. of risks taken	1.07	1.06	1.05	1.09

NOTE.—The figures are taken from the reports of the Superintendent of Insurance for the Dominion for 1919–20–21–22, and cover the business throughout Canada of the companies to which they refer.

TABLE IV.—RATIO OF LOSSES INCURRED TO PREMIUMS WRITTEN IN THE VARIOUS PROVINCES.

Provinces.	1921.	1920.	1919.	1918.	1917.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Alberta	55.76	34.46	34.60	44.64	32.87
British Columbia	44.56	30.36	29.84	29.79	25.40
Manitoba	56.79	41.23	25.25	62.38	59.15
New Brunswick	78.36	65.89	52.48	42.89	59.54
Nova Scotia	79.09	70.91	50.32	28.40	69.29
Ontario	56.51	38.77	40.89	59.47	62.77
Prince Edward Island	43.81	35.74	46.87	20.55	48.52
Quebec	65.13	57.18	50.54	52.69	60.98
Saskatchewan	36.43	42.96	39.23	48.74	44.44
Yukon	2.69	2.45	....	5.86	5.26
Totals	59.51	45.61	41.10	50.76	55.62

TABLE V.—FIRES REPORTED.

Districts reporting.	Number.	Amount of Loss.
City Municipalities (35).		
Alberni	2	$ 562
Armstrong	3	3,065
Chilliwack	7	11,162
Courtenay	2	4,925
Cranbrook	3	295
Cumberland	2	3,473
Duncan	2	591
Enderby	3	1,165
Fernie	12	2,377
Grand Forks	7	4,022
Greenwood	....	....
Kamloops	8	6,160
Kaslo	1	34
Kelowna	10	165,449
Ladysmith	4	205
Merritt	3	3,658
Nanaimo	21	47,490
Nelson	14	20,958
New Westminster	36	36,995

TABLE V.—FIRES REPORTED—*Continued.*

Districts reporting.	Number.	Amount of Loss.
City Municipalities—Continued.		
North Vancouver	27	$ 16,089
Phoenix	.....	.....
Port Alberni	4	65,100
Port Coquitlam	10	21,855
Port Moody	6	5,265
Prince George	9	6,797
Prince Rupert	14	6,400
Revelstoke	13	11,142
Rossland	16	2,948
Salmon Arm	1	3,000
Sandon	.....	.....
Slocan	.....	.....
Trail	8	17,140
Vancouver	449	342,256
Vernon	5	1,512
Victoria	140	47,679
Totals	844	$861,251
District Municipalities (28).		
Burnaby	32	54,395
Chilliwack	7	15,780
Coldstream	.....	.....
Coquitlam	3	2,166
Delta	2	7,515
Esquimalt	8	3,169
Fraser Mills	1	7,067
Kent	1	51
Langley	19	45,629
Maple Ridge	9	19,707
Matsqui	3	7,646
Mission	6	18,749
North Cowichan	9	14,557
North Vancouver	6	4,591
Oak Bay	12	2,364
Peachland	2	850
Penticton	6	10,085
Pitt Meadows	.....	.....
Point Grey	38	167,399
Richmond	12	43,735
Saanich	25	72,454
Salmon Arm	.....	.....
South Vancouver	81	66,607
Spallumcheen	.....	.....
Sumas	.....	.....
Summerland	5	4,919
Surrey	8	24,699
West Vancouver	9	1,233
Totals	304	$595,367
Insurance Districts (16).		
Boundary	5	13,650
Fort George	5	14,195
Hazelton	6	30,045
Kamloops	12	36,776
Kootenay, North-east	7	37,725
Kootenay, South-east	22	89,412
Kootenay, West	30	154,154
Lillooet	8	68,372
Nanaimo, West Coast	27	105,286
Peace River	6	36,462
Prince Rupert	14	67,494
Princeton	2	107
Vancouver-New Westminster	29	115,282
Vernon	12	38,243
Victoria	13	37,924
Yale	12	41,223
Totals	210	$ 886,350
Grand totals	1,358	$2,342,968

NOTE.—Construction of buildings—

Fire-resisting	4,	loss $	320
Brick	105,	„	214,521
Frame	1,249,	„	2,128,127
	1,358,	„	$2,342,968

Average loss per diem, $6,446.52.

Loss *per capita*—

The Province, estimated population, 550,000	$4 26
City of Vancouver, estimated population, 175,000	1 95
City of Victoria, estimated population, 55,000	87
City of New Westminster, estimated population, 16,500	2 24
City of Fernie, estimated population, 5,000	67
City of Nelson, estimated population, 6,000	3 49

TABLE VI.—CAUSES OF FIRES.

Causes of Fires.	Number.	Amount of Loss.
Ashes against wood	24	$ 16,141
Boiler or boiler-pipe insufficiently protected	4	249
Burning tar out of waste-pipe from roof	1	115
Candle carelessness	9	259
Canned heat spilled or upset	1	20
Carburettor back-firing	18	11,744
Celluloid doll ignited and fell on floor	1	95
Clothes too near stove	25	11,811
Coal-oil carelessness	2	1,551
Combustion of hot asphaltum	1	29,925
Curtains from lamp	2	7
Curtains from stove	3	272
Defective blower-pipe	1	1,200
Defective brooder	1	150
Defective chimney	61	66,247
Defective electrical motor	1	25,000
Defective fireplace	31	14,804
Defective furnace or furnace-pipe	5	3,628
Defective gas connection	1	30
Defective incubator	1	1,150
Defective motor	1	50
Defective stove or stove-pipe	51	40,722
Defective wiring	35	94,136
Dust in roaster-pipe caught fire from gas-burner	1	189
Electrical appliances	33	13,063
Exposure	70	158,578
Fire-crackers	3	2,383
Friction in planer	1	207
Furnace or furnace-pipe insufficiently protected	12	12,694
Gas-burner insufficiently protected	1	50
Gasolene carelessness	8	2,456
Gasolene-torch explosion	1	25
Gas-pipe insufficiently protected	1	15
Glass vapour-container bursting	1	41
Grease on stove or range	9	13,411
Hot bearing	1	1,200
Hot iron in box of lime	1	6,602
Hot metal placed in sacks	1	662
Hot steel left on floor	1	647
Incendiary	27	131,893
Lamp upset	19	29,979
Lantern upset	3	9,149
Lightning	3	4,544
Live coals	4	460
Match carelessness	20	25,555
Matches, children with	12	4,435
Matches, mice with	2	110
Mattress too near stove	1	12
Mixing paint on stove	1	2,950
Oil-stove explosion	5	37,892
Oven insufficiently protected	3	218
Overheating of starting compensator	1	883
Paper from stove	1	3,000
Paraffin boiling over on stove	1	3
Piano from lamp	1	10
Short circuit	9	2,398
Smudge left unattended	1	17,500
Smokers' carelessness	109	93,525
Sparks from boiler	1	5,730
Sparks from burning rubbish	8	7,808
Sparks from bush fire	16	36,489
Sparks from chimney	246	75,270
Sparks from Dutch oven	2	2,705
Sparks from engine	1	1,200
Sparks from fireplace	47	8,955
Sparks from forge	2	58
Sparks from furnace	2	22,490
Sparks from locomotive	1	10
Sparks from magneto	1	100
Sparks from mill burner	8	107,794
Sparks from pile-driver	1	5,000
Sparks from smoke-house fire	1	5,132
Sparks from smoke-stack	4	3,859
Sparks from stove	24	44,428
Sparks from welding-machine	1	17
Spontaneous combustion	17	53,717
Stove explosion	5	8,290
Stove or stove-pipe insufficiently protected	61	43,469
Suit-case too close to stove	1	12
Sun's rays through window ignited waste paper	1	81
Tar boiling over	5	4,870
Thawing pipes	12	7,717
Unknown	229	993,974
Wood too near stove	12	7,748
Totals	1,358	$2,342,968

TABLE VII.—CLASSIFICATION OF PROPERTY BURNED AND CAUSES.

Property.		Causes.		Amount of Loss.	
Apartments	19	Ashes against wood	1	$ 40	
		Boiler insufficiently protected	1	99	
		Defective chimney	1	66	
		Defective fireplace	1	43	
		Electrical appliances	2	535	
		Match carelessness	1	12	
		Smokers' carelessness	4	180	
		Sparks from burning rubbish	1	28	
		Sparks from chimney	5	923	
		Stove insufficiently protected	1	7	
		Unknown	1	20	
					$ 1,953
Automobiles	43	Carburettor back-firing	17	$ 8,444	
		Defective wiring	7	599	
		Gasolene carelessness	4	445	
		Match carelessness	1	2	
		Short circuit	2	510	
		Smokers' carelessness	3	2,310	
		Sparks from magneto	1	100	
		Unknown	8	5,332	
					17,742
Bakeries	4	Oven insufficiently protected	1	$ 118	
		Sparks from chimney	1	34	
		Sparks from stove	1	700	
		Unknown	1	4,670	
					5,522
Banks	3	Exposure	2	$ 8,731	
		Unknown	1	212	
					8,943
Barber-shops	1	Incendiary	1	.....	600
Barns	10	Exposure	1	$ 1,050	
		Lantern upset	2	5,752	
		Lightning	1	1,510	
		Spontaneous combustion	1	1,500	
		Unknown	5	12,046	
					21,858
Blacksmith-shops	4	Defective wiring	1	$ 625	
		Hot metal placed in sacks	1	662	
		Hot steel left on floor	1	647	
		Unknown	1	700	
					2,634
Boarding-houses	11	Exposure	3	$ 17,474	
		Smokers' carelessness	1	5	
		Sparks from chimney	4	6,994	
		Sparks from fireplace	2	35	
		Unknown	1	5	
					24,513
Boiler-houses	1	Live coals	1	.....	150
Bottling-works	1	Exposure	1	.....	203
Breweries	2	Smokers' carelessness	1	$ 5	
		Unknown	1	74	
					79
Bunk-houses	6	Clothes too near stove	1	$ 10	
		Defective chimney	1	10	
		Defective wiring	1	4,880	
		Sparks from stove	1	1,000	
		Unknown	2	9,175	
					15,075
Canneries (fruit)	2	Exposure	1	$ 27,082	
		Unknown	1	134,492	
					161,574
Carpenter-shops	1	Unknown	1	.....	10
Chicken-houses	5	Defective brooder	1	$ 150	
		Sparks from bush fire	1	1,000	
		Tar boiling over	1	70	
		Unknown	2	248	
					1,468
Churches	4	Defective chimney	1	$ 50	
		Exposure	1	70	
		Unknown	2	6,030	
					6,150
Cleaning establishments	1	Electrical appliances	1	.....	50
Clubs	3	Grease on range	1	$ 1,134	
		Smokers' carelessness	1	537	
		Unknown	1	65	
					1,736
Dairies	2	Oven insufficiently protected	1	$ 65	
		Unknown	1	1,850	
					1,915
Dredges	1	Unknown	1	.....	7,500
Dry-kilns	7	Defective blower-pipe	1	$ 1,200	
		Sparks from mill burner	1	10,000	
		Unknown	5	33,448	
					44,648

TABLE VII.—CLASSIFICATION OF PROPERTY BURNED AND CAUSES—*Continued.*

Property.		Causes.		Amount of Loss.	
Dwellings	820	Ashes against wood	13	$ 432	
		Candle carelessness	9	259	
		Canned heat upset	1	20	
		Celluloid doll ignited and dropped on floor	1	95	
		Clothes too near stove	22	10,747	
		Coal-oil carelessness	2	1,551	
		Curtain from lamp	2	7	
		Curtain from stove	3	272	
		Defective chimney	45	40,596	
		Defective fireplace	29	14,669	
		Defective furnace	1	110	
		Defective gas connection	1	30	
		Defective stove or stove-pipe	39	33,880	
		Defective wiring	13	8,772	
		Electrical appliances	23	1,496	
		Exposure	26	23,702	
		Fire-crackers	2	2,368	
		Furnace insufficiently protected	7	2,021	
		Gasolene carelessness	2	434	
		Grease on stove	6	1,914	
		Incubator	1	1,150	
		Incendiary	9	8,800	
		Lamp explosion	17	18,030	
		Lightning	1	2,419	
		Live coals from stove	1	10	
		Match carelessness	12	3,110	
		Matches, children with	6	3,107	
		Matches, mice with	1	99	
		Mattress too near stove	1	12	
		Mixing paint on stove	1	2,950	
		Oil-stove explosion	1	12	
		Paper from stove	1	3,000	
		Paraffin boiling over on stove	1	3	
		Piano from lamp	1	10	
		Smokers' carelessness	30	3,111	
		Sparks from burning rubbish	5	265	
		Sparks from bush fire	11	3,868	
		Sparks from chimney	223	65,050	
		Sparks from fireplace	45	8,915	
		Sparks from mill burner	3	769	
		Sparks from smoke-stack	2	1,207	
		Sparks from stove	21	39,831	
		Spontaneous combustion	6	2,921	
		Stove explosion	5	8,200	
		Stove insufficiently protected	45	28,178	
		Suit-case too near stove	1	12	
		Tar boiling over on stove	4	4,800	
		Thawing pipes	9	5,247	
		Unknown	98	163,591	
		Wood too near stove	11	4,748	
					$ 526,890
Dynamo-houses	1	Defective wiring	1	.....	2,400
Electrical plants	1	Unknown	1	.....	10,000
Electrical sub-stations	1	Short circuit	1	.....	415
Engines	1	Sparks from bush fire	1	.....	1,436
Factories (biscuit)	1	Spontaneous combustion	1	.....	183
Factories (bolt)	1	Defective furnace-pipe	1	.....	904
Factories (carriage)	1	Spontaneous combustion	1	.....	25
Factories (doll)	1	Unknown	1	.....	2,495
Factories (jam)	1	Unknown	1	.....	3,074
Factories (pickle)	1	Electrical appliances	1	.....	4,500
Factories (macaroni)	1	Unknown	1	.....	750
Factories (roofing material)	2	Incendiary	1	$ 3,028	
		Unknown	1	1,704	
					4,732
Factories (rug)	1	Stove explosion	1	.....	11,360
Factories (sash and door)	2	Unknown	2	.....	3,088
Factories (seed)	1	Defective chimney	1	.....	25
Factories (wall-board)	1	Defective furnace-pipe	1	.....	1,576
Factories (woollen)	1	Unknown	1	.....	17,853
Fish-curing plants	1	Sparks from smoke-house	1	.....	5,132
Flour-mills	1	Hot bearing	1	.....	1,200
Foundries	2	Sparks from furnace	1	$ 2,790	
		Sparks from smoke-stack	1	90	
					2,880
Garages	20	Ashes against wood	1	$ 20	
		Carburettor back-firing	1	3,300	
		Defective wiring	1	25	
		Incendiary	1	17,159	
		Match carelessness	1	7,950	
		Matches, children with	1	400	
		Smokers' carelessness	1	50	
		Stove insufficiently protected	1	125	
		Unknown	12	15,885	
					44,914

TABLE VII.—CLASSIFICATION OF PROPERTY BURNED AND CAUSES—*Continued.*

Property.		Causes.		Amount of Loss.	
Gas plants	1	Live coals from furnace	1	..... $	200
Gas stations	1	Match carelessness	1	.....	20
Greenhouses	1	Defective furnace	1	.....	416
Halls	8	Defective chimney	1	$ 80	
		Spontaneous combustion	1	20	
		Unknown	1	2,200	
					2,300
Hospitals	6	Defective chimney	1	$ 2,919	
		Defective stove	1	150	
		Exposure	1	4,760	
		Live coals from stove	1	100	
		Sparks from chimney	1	20	
		Unknown	1	100	
					8,049
Hotels	48	Ashes against wood	1	$ 362	
		Defective chimney	1	150	
		Defective stove-pipe	1	3,600	
		Electrical appliances	1	46	
		Exposure	1	7,000	
		Furnace insufficiently protected	1	32	
		Incendiary	1	534	
		Match carelessness	1	40	
		Oil-stove explosion	2	218	
		Smokers' carelessness	21	12,644	
		Sparks from chimney	3	2,119	
		Spontaneous combustion	2	365	
		Stove insufficiently protected	2	75	
		Thawing pipes	1	25	
		Unknown	9	49,683	
					76,893
House-construction plants	1	Unknown	1	.....	27,000
Launches	3	Defective wiring	1	$ 162	
		Unknown	2	1,510	
					1,672
Laundries	3	Ashes against wood	1	$ 225	
		Exposure	1	1,100	
		Sparks from chimney	1	10	
					1,335
Libraries	1	Unknown	1	.....	50
Logging camps	2	Smokers' carelessness	1	$ 39,820	
		Sparks from Dutch oven	1	1,985	
					41,805
Lumber-mills	9	Incendiary	1	$ 6,915	
		Lantern upset	1	3,397	
		Smokers' carelessness	1	7,067	
		Sparks from bush fire	1	935	
		Sparks from mill burner	1	36,022	
		Unknown	4	6,908	
					61,244
Machine-shops	3	Furnace insufficiently protected	1	$ 142	
		Oven insufficiently protected	1	35	
		Sparks from forge	1	10	
					187
Mess-houses	3	Grease on stove	1	$ 9,899	
		Stove insufficiently protected	1	37	
		Unknown	1	3,800	
					13,736
Mining property	3	Defective wiring	1	$ 1,379	
		Unknown	2	69,618	
					70,997
Motor-cycles	2	Gasolene carelessness	2	.....	133
Motors	1	Defective	1	.....	50
Offices	11	Ashes against wood	1	$ 50	
		Defective wiring	1	35	
		Exposure	1	92	
		Furnace insufficiently protected	1	35	
		Glass vapour-container bursting	1	41	
		Smokers' carelessness	3	5,818	
		Sparks from chimney	1	30	
		Stove-pipe insufficiently protected	1	308	
		Unknown	1	14	
					6,423
Photograph studios	2	Gas-burner insufficiently protected	1	$ 50	
		Stove insufficiently protected	1	44	
					94
Planing-mills	3	Friction in planer	1	$ 207	
		Short circuit	1	671	
		Spontaneous combustion	1	27,000	
					27,878
Poles	3	Exposure	1	$ 21	
		Sparks from bush fire	1	20,181	
		Unknown	1	1,524	
					21,726
Pool-rooms	4	Defective chimney	1	$ 525	
		Defective stove	1	8	
		Exposure	2	4,450	
					4,983

TABLE VII.—CLASSIFICATION OF PROPERTY BURNED AND CAUSES—*Continued.*

Property.		Causes.		Amount of Loss	
Post-offices	1	Match carelessness	1	..... $	25
Printing-offices	1	Smokers' carelessness	1	.....	1,339
Railway-cars	3	Unknown	3	.....	1,150
Refineries (fish-meal and oil)	1	Incendiary	1	.....	21,789
Refineries (sugar)	1	Unknown	1	.....	3,856
Restaurants	9	Defective chimney	1	$ 2,800	
		Defective fireplace	1	92	
		Exposure	1	2,800	
		Grease on stove	1	464	
		Incendiary	1	12,250	
		Smokers' carelessness	1	20	
		Sparks from chimney	1	1,108	
		Unknown	2	2,382	
					21,916
Road-houses	1	Unknown	1	.....	1,400
Roofing plants	1	Combustion of hot asphaltum	1	.....	29,925
Rooming-houses	8	Defective chimney	1	$ 60	
		Exposure	2	7,716	
		Incendiary	1	470	
		Smokers' carelessness	3	53	
		Unknown	1	5,389	
					13,688
Sawmills	18	Defective electric motor	1	$ 25,000	
		Defective wiring	1	75,000	
		Incendiary	1	15,000	
		Match carelessness	1	15,000	
		Smudge left unattended	1	17,500	
		Sparks from boiler	1	5,730	
		Sparks from burning rubbish	1	2,562	
		Sparks from bush fire	1	9,069	
		Sparks from Dutch oven	1	720	
		Sparks from engine	1	1,200	
		Sparks from mill burner	2	54,500	
		Spontaneous combustion	1	9,404	
		Unknown	5	78,229	
					308,914
Schools	9	Ashes against wood	1	$ 13,151	
		Furnace insufficiently protected	1	1,764	
		Sparks from chimney	3	111	
		Sparks from forge	1	48	
		Stove insufficiently protected	1	10	
		Unknown	2	9,512	
					24,596
Sheds	8	Ashes against wood	2	$ 70	
		Lightning	1	615	
		Matches, children with	2	60	
		Smokers' carelessness	2	102	
		Unknown	1	150	
					997
Shingle-mills	11	Exposure	1	$ 600	
		Overheating of starting-compensator	1	883	
		Sparks from furnace	1	19,700	
		Sparks from mill burner	1	6,500	
		Unknown	7	205,006	
					232,689
Shipyards	1	Hot iron in box of lime	1	.....	6,602
Spice-mills	1	Dust in roaster-pipe caught fire from gas-burner	1	.....	189
Stables	8	Smokers' carelessness	3	$ 5,050	
		Unknown	5	11,625	
					16,675
Stores	85	Ashes against wood	1	$ 132	
		Burning tar out of waste-pipe from roof	1	115	
		Defective chimney	5	5,598	
		Defective stove-pipe	4	799	
		Defective wiring	3	205	
		Electrical appliances	4	6,425	
		Exposure	15	36,287	
		Furnace-pipe insufficiently protected	1	8,700	
		Gas-pipe insufficiently protected	1	15	
		Incendiary	4	34,566	
		Match carelessness	3	237	
		Oil-stove explosion	1	37,650	
		Smokers' carelessness	10	9,789	
		Sparks from burning rubbish	1	15	
		Sparks from chimney	4	859	
		Sparks from locomotive	1	10	
		Stove insufficiently protected	4	125	
		Sun's rays through window	1	81	
		Thawing pipes	2	2,445	
		Unknown	13	36,966	
					181,019
Stores and apartments over	5	Clothes too near stove	1	$ 254	
		Defective furnace	1	622	
		Defective wiring	1	9	
		Unknown	2	11,982	
					12,867

TABLE VII.—CLASSIFICATION OF PROPERTY BURNED AND CAUSES—*Continued.*

Property.		Causes.		Amount of Loss.	
Stores and dwellings over ..	27	Ashes against wood	1	$ 1,654	
		Boiler insufficiently protected	1	18	
		Defective chimney	1	10,374	
		Exposure	4	5,972	
		Fire-crackers	1	15	
		Incendiary	2	5,600	
		Lamp upset	2	11,949	
		Matches, mice with	1	11	
		Sparks from burning rubbish	1	7,500	
		Sparks from chimney	3	519	
		Smokers' carelessness	5	472	
		Unknown	4	6,281	
		Wood too near stove	1	3,000	
					$ 53,365
Stores and offices over	4	Electrical appliances	1	$ 11	
		Oil-stove explosion	1	12	
		Smokers' carelessness	2	68	
					91
Stores and rooms over	20	Ashes against wood	1	$ 5	
		Defective chimney	1	3,000	
		Defective stove	2	4,890	
		Defective wiring	1	6	
		Furnace-pipe insufficiently protected	1	25	
		Gasolene carelessness	1	1,444	
		Incendiary	2	4,882	
		Match carelessness	1	27	
		Smokers' carelessness	6	163	
		Unknown	4	9,059	
					23,501
Street-cars	6	Defective wiring	2	$ 39	
		Short circuit	4	702	
					741
Talc-grinding mills	1	Exposure	1	.....	2,100
Tanneries	1	Unknown	1	.....	12,143
Theatres	4	Defective chimney	1	$ 25	
		Exposure	1	3,738	
		Smokers' carelessness	1	4,907	
		Unknown	1	4,000	
					12,670
Tin-shops	1	Gasolene-torch exploded	1	.....	25
Transformers	2	Exposure	1	$ 1,500	
		Short circuit	1	100	
					1,600
Tug-boats	1	Spontaneous combustion	1	.....	1,000
Undertaking parlours	1	Smokers' carelessness	1	.....	15
Warehouses	9	Boiler insufficiently protected	1	$ 107	
		Clothes too near stove	1	800	
		Defective chimney	1	25	
		Defective stove	1	136	
		Exposure	1	250	
		Incendiary	1	300	
		Sparks from pile-driver	1	5,000	
		Spontaneous combustion	1	9,800	
		Stove insufficiently protected	1	2,200	
					18,618
Wharves	1	Sparks from welding-machines	1	.....	17
Totals	1,358		1,358	.....	$2,342,968

TABLE VIII.—SUMMARY.

	Fires reported.				Amount of loss.			
	Cities (35).	Other Municipalities (28).	Insurance Districts (16).	Total.	Cities.	Other Municipalities.	Insurance Districts.	Total.
1921.								
January	61	19	13	93	$ 23,732	$ 21,039	$ 25,852	$ 70,623
February	62	11	7	80	48,446	8,591	7,826	87,863
March	60	32	15	107	41,251	41,791	46,954	130,026
April	98	24	22	144	64,954	113,526	94,903	273,383
May	79	15	18	112	56,828	21,180	131,550	209,558
June	56	16	16	88	42,547	49,311	99,828	191,686
July	36	35	21	142	292,901	45,627	168,828	507,356
August	54	24	17	95	45,430	139,433	41,352	226,215
September	72	29	82	123	53,674	59,794	81,620	195,088
October	56	27	14	97	66,662	16,970	28,013	111,645
November	66	38	24	128	45,256	45,656	95,956	186,868
December	94	34	21	149	79,540	32,449	40,668	152,657
Totals, 1921	844	304	210	1,358	$ 861,251	$ 595,367	$ 886,350	$ 2,342,968
Totals, 1920	787	219	176	1,182	1,083,532	644,551	907,449	2,635,532
Totals, 1919	853	204	164	1,221	1,013,890	413,266	500,736	1,927,892
Totals, 1918	619	220	105	944	800,668	863,306	431,252	2,095,226
Totals, 1917	422	123	117	662	756,427	227,442	558,009	1,541,878
	3,525	1,070	772	5,367	$4,515,768	$2,743,932	$3,283,796	$10,543,496

TABLE IX.—LOSS OF LIFE, 1917–21.

Occupancy.	Cause of Fire.	Loss of Life.	
		Adults.	Children.
Dwelling	Coal-oil carelessness	3	..
Dwelling	Gasolene carelessness	1	..
Dwelling	Smokers' carelessness	2	1
Hotel	Unknown	2	..
Store	Gasolene carelessness	1	..
Store	Unknown	1	..
Totals		10	1
Totals, 1920		12	1
Totals, 1919		2	3
Totals, 1918		4	..
Totals, 1917		8	1

TABLE X.—INVESTMENTS IN BRITISH COLUMBIA OF COMPANIES OTHER THAN LIFE INSURANCE COMPANIES.

(For British Columbia investments of Life Insurance Companies *see* Abstract of Returns of Life Insurance Companies, *post.*)

Name of Company.	Mortgages.	In other Securities.
American Central Insurance Co.	.....	$ 30,660 00*
Beaver Fire Insurance Co.	$ 33,050 86	.....
Boiler Inspection & Insurance Co.	.....	44,000 00*
British America Assurance Co.	.....	256,000 00*
British Columbia Plate Glass Insurance Co.	.....	5,973 33*
British Colonial Fire Insurance Co.	.....	3,000 00
British Crown Assurance Corporation, Ltd.	.....	15,000 00*
British Northwestern Fire Insurance Co.	1,500 00	7,500 00
Caledonian Insurance Co., Ltd.	834,968 31	229,704 33
California Insurance Co.	.....	25,000 00
Canada Accident & Fire Assurance Co.	.....	19,000 00
Canada National Fire Insurance Co.	62,922 34	.....
Canadian Surety Co.	.....	25,733 33*
Century Insurance Co., Ltd.	.....	50,334 00
Commercial Union Assurance Co., Ltd.	217,250 00	.....
Continental Casualty Co.	.....	15,350 00
Dominion Fire Insurance Co.	11,500 00	80,353 33*
Dominion of Canada Guarantee & Accident Insurance Co.	.....	99,000 00*
Fireman's Fund Insurance Co.	.....	86,294 00
General Accident Assurance Co. of Canada	.....	32,595 71*
General Accident Fire & Life Assurance Co., Ltd.	.....	40,603 31
Glens Falls Insurance Co.	.....	146,000 00
Globe Indemnity Co. of Canada	.....	5,000 00
Guardian Insurance Co. of Canada	.....	39,333 33
Hartford Fire Insurance Co.	.....	76,000 00*
Home Insurance Co.	.....	50,000 00*
Hudson Bay Insurance Co.	92,464 19	29,000 00*
Imperial Guarantee & Accident Insurance Co.	.....	29,676 50†
Imperial Underwriters Corporation of Canada	90,651 00	30,434 75†
Insurance Co. of the State of Pennsylvania	.....	53,200 00*
London Assurance Corporation	.....	101,000 00
London Mutual Fire Insurance Co. of Canada	.....	65,806 20
Loyal Protective Insurance Co.	.....	9,625 00†
Maritime Insurance Co., Ltd.	.....	37,500 00
Maryland Casualty Co.	.....	44,733 33
Mount Royal Assurance Co.	.....	60,000 00*
National Benefit Assurance Co., Ltd.	.....	19,866 66
National Ben Franklin Fire Insurance Co.	.....	87,220 00*
National Fire Insurance Co. of Hartford	.....	22,984 75
National Union Fire Insurance Co.	.....	35,000 00*
North American Accident Insurance Co.	.....	4,937 50†
North British & Mercantile Insurance Co.	354,500 00	122,000 00
North Empire Fire Insurance Co.	.....	45,000 00†
Northern Assurance Co., Ltd.	.....	182,000 00
Northwestern National Insurance Co.	.....	44,150 40
Norwich Union Fire Insurance Society, Ltd.	.....	46,000 00
Pacific Coast Fire Insurance Co.	79,960 69	606,624 10
Pacific Marine Insurance Co.	20,000 00	7,500 00†
Phoenix Insurance Co.	.....	19,000 00†
Queen Insurance Co. of America	.....	32,000 00*
Royal Insurance Co., Ltd.	280,000 00	214,850 67
Royal Plate Glass Insurance Co. of Canada	.....	2,250 00
Springfield Fire & Marine Insurance Co.	.....	45,000 00
Western Assurance Co.	.....	104,000 00†
Yorkshire Insurance Co., Ltd.	245,434 61	304,328 81
Totals	$2,324,202 00	$3,788,132 34

* Par value. † Book value.

TABLE XI.—ABSTRACT OF THE RETURNS OF LIFE INSURANCE COMPANIES TRANSACTING BUSINESS IN THE PROVINCE OF BRITISH COLUMBIA, 1921.

Name of Company.	Premiums for the Year.	Number of Policies, new and taken up.	Amount of Policies, new and taken up.	Number of Policies In Force at Date.	Net Amount in Force.	Number of Policies become Claims.	Net Amount of Policies become Claims.	Claims paid including Matured Endowments.	Unsettled Claims.		Amount invested in British Columbia.	
									Not resisted.	Resisted.	On Mortgages.	On other Securities.
1. Aetna Life Insurance Co.	$ 16,223 06	26	$ 103,500 00	111	375,495 00	....	$ 4,000 00	$ 4,000 00	$ 89 00	*Nil.*	*Nil.*	*Nil.*
2. Canada Life Assurance Co.	374,498 54	761	2,040,453 60	4,274	$ 10,736,828 00	25	65,922 65	88,174 90	5,981 45	*Nil.*	694,118 78	* $1,540,661 99
3. The Capital Life Assurance Co.	3,140 65	20	46,000 00	38	92,000 00	....	*Nil.*	*Nil.*	*Nil.*	*Nil.*	*Nil.*	* 31,245 00
4. Commercial Union Assurance Co., Ltd.	371 80	....	.....	5	10,000 00	....	.....	.....	.....	....	217,250 00	* *Nil.*
5. Confederation Life Assurance Co.	310,745 58	708	1,593,920 00	4,819	9,921,498 00	....	51,751 00	50,751 00	5,000 00	*Nil.*	1,020,644 51	* 548,968 48
6. The Continental Life Insurance Co.	51,724 42	110	233,000 00	1,073	1,811,409 00	6	9,000 00	7,000 00	4,269 66	*Nil.*	*Nil.*	† 178,983 83
7. The Crown Life Insurance Co.	120,461 03	....	782,429 00	....	4,496,779 00	....	25,491 35	24,491 35	5,000 00	*Nil.*	14,118 00	* 98,934 36
8. The Dominion Life Assurance Co.	66,190 78	....	792,770 00	....	2,100,412 00	8	9,180 00	10,180 00	2,095 00	*Nil.*	58,482 81	* 274,857 40
9. The Excelsior Life Insurance Co.	84,387 10	....	592,500 00	....	2,595,227 00	10	15,755 00	17,755 00	7,000 00	*Nil.*	*Nil.*	*Nil.*
10. The Great West Life Assurance Co.	716,012 00	....	4,400,748 00	....	24,021,218 00	....	142,006 35	132,079 05	25,326 00	*Nil.*	415,511 24	* 143,953 54
11. The Imperial Life Assurance Co.	330,662 93	739	1,711,898 00	4,530	9,377,952 00	....	54,690 20	55,890 20	2,000 00	*Nil.*	99,830 26	* 201,207 24
12. The London & Scottish Assurance Corporation, Ltd.	30,236 00	13	22,500 00	....	927,348 00	14	20,300 00	20,300 00	2,800 00	*Nil.*	*Nil.*	* 169,000 00
13. The London Life Insurance Co.	104,231 04	528	867,700 00	1,776	2,678,482 00	9	10,023 58	7,623 58	3,000 00	*Nil.*	*Nil.*	† 970,226 11
14. The Manufacturers Life Insurance Co.	185,305 25	497	1,034,685 00	1,954	3,916,845 00	16	26,593 00	24,660 40	5,356 00	*Nil.*	6,605 50	† 389,565 47
15. Metropolitan Life Insurance Co. { Ordinary	392,875 97	2,254	2,640,000 00	12,550	12,720,000 00	70	58,565 00	56,883 00	3,682 00	....	.....	.....
{ Industrial	355,010 31	5,735	2,500,000 00	63,101	8,375,000 00	397	40,698 50	40,358 50	590 00	$105 00	1,750 00	† 1,149,771 43
16. The Monarch Life Assurance Co.	200,880 10	....	1,921,316 00	....	7,769,983 00	....	11,123 60	11,123 60	1,000 00	*Nil.*	24,230 75	* 83,372 23
17. Mutual Life Assurance Co. of Canada	545,942 66	1,086	2,528,644 00	8,333	16,302,897 00	64	114,943 00	119,221 00	16,722 00	*Nil.*	434,233 56	* 919,976 74
18. The Mutual Life Insurance Co. of New York	94,571 01	141	297,009 88	1,757	3,440,580 00	33	65,395 00	44,324 00	21,071 00	*Nil.*	*Nil.*	*Nil.*
19. National Life Assurance Co. of Canada	64,193 62	144	428,101 00	1,080	2,407,063 00	....	43,500 00	39,000 00	8,500 00	*Nil.*	*Nil.*	*Nil.*
20. New York Life Insurance Co.	438,078 70	391	937,026 00	5,645	12,141,999 00	78	156,780 03	164,298 03	7,141 00	*Nil.*	857,000 00	= 100,000 00
21. North American Life Assurance Co.	355,504 06	820	1,838,085 00	....	9,155,583 00	....	81,960 93	79,350 93	4,670 73	*Nil.*	603,167 81	* 799,052 21
22. The Northern Life Assurance Co.	38,347 20	....	438,160 00	....	1,243,042 00	7	14,617 70	14,561 75	55 95	*Nil.*	10,500 00	* 238,265 77
23. Norwich Union Life Insurance Society.	115 64	....	.....	....	3,649 50	....	.....	.....	.....	....	82,260 00	* 33,846 67
24. Phoenix Assurance Co.	9,369 30	1	2,000 00	141	372,009 40	3	6,791 00	6,791 00	*Nil.*	*Nil.*	45,000 00	* 62,980 00
25. The Prudential Insurance Co. of America. { Ordinary	170,183 75	813	1,166,527 00	5,156	5,980,796 00	30	42,994 46	30,421 46	13,573 00	*Nil.*	.....	.....
{ Industrial	213,106 21	6,867	1,348,054 00	35,789	5,665,175 00	139	21,945 95	22,504 13	539 07	*Nil.*	*Nil.*	‡ 324,825 51
26. Royal Insurance Co., Ltd.	108,704 95	165	587,049 00	1,246	3,685,293 00	5	8,150 00	8,850 00	500 00	*Nil.*	.....	‡ 46,653 69
27. Sovereign Life Assurance Co.	54,122 87	128	297,500 00	573	1,257,517 00	6	14,286 40	14,286 40	*Nil.*	*Nil.*	*Nil.*	* 66,323 27
28. The Standard Life Assurance Co. §	37,086 77	60	159,500 00	454	1,139,388 13	15	39,886 62	38,331 53	8,137 37	*Nil.*	199,000 00	* 111,904 55
29. Sun Life Assurance Co. of Canada	675,499 90	1,692	3,179,029 00	9,855	19,481,020 00	69	140,793 15	179,822 15	6,360 72	*Nil.*	930,121 57	* 3,844,190 24
30. The Travelers Insurance Co.	48,814 74	150	718,937 00	569	2,555,841 00	....	*Nil.*	*Nil.*	*Nil.*	*Nil.*	*Nil.*	= 560,990 00
31. Travellers Life Assurance Co. of Canada	5,375 25	10	36,500 00	53	139,660 00	....	*Nil.*	*Nil.*	*Nil.*	*Nil.*	*Nil.*	* 10,000 00
32. Union Mutual Life Insurance Co.	16,324 13	11	21,000 00	272	547,000 00	6	12,671 26	11,735 54	2,043 73	*Nil.*	*Nil.*	* 129,966 67
33. Western Empire Life Assurance Co.	16,589 23	....	175,500 00	....	563,650 00	....	*Nil.*	*Nil.*	.....	....	11,525 00	* 17,813 20
34. Western Life Assurance Co.	28,810 07	....	301,800 00	....	921,300 00	1	5,000 00	6,943 40	*Nil.*	*Nil.*	*Nil.*	* 6,254 81
	$6,263,696 62	.....	$35,743,840 88	.....	$188,929,939 03	.....	$1,314,815 73	$1,331,711 90	$162,503 68	$105 00	$5,725,349 79	$13,053,790 41

* Basis of valuation not stated. † Book value. ‡ Including loan on policies. || Par value. § Year ended November, 15th, 1921.

TABLE XII.—LIFE INSURANCE SUMMARY.

	1917.	1918.	1919.	1920.	1921.
Premiums for year	$ 3,313,000	$ 4,026,000	$ 4,767,000	$ 5,848,000	$ 6,264,000
Net amount in force	95,309,000	112,978,000	141,549,000	171,650,000	188,930,000
Claims paid	1,302,000	1,558,000	1,851,000	1,460,000	1,332,000

TABLE XIV.—MISCELLANEOUS INSURANCE SUMMARY.

	1917.	1918.	1919.	1920.	1921.
Accident, P.	$197,000	$221,000	$249,000	$349,000	$334,000
„ L.	111,000	78,000	113,000	154,000	160,000
Sickness, P.	50,000	73,000	106,000	115,000	141,000
„ L.	21,000	41,000	65,000	52,000	71,000
Liability, P.	68,000	31,000	42,000	27,000	30,000
„ L.	103,000	14,000	34,000	7,000	10,000
Automobile, P.	135,000	230,000	423,000	566,000	648,000
„ L.	50,000	65,000	142,000	273,000	346,000
Marine, P.	283,000	404,000	472,000	438,000	486,000
„ L.	152,000	125,000	210,000	253,000	306,000
Other forms, P.	74,000	79,000	134,000	164,000	166,000
„ L.	22,000	21,000	35,000	86,000	65,000

P.—Premiums. L.—Losses.

	Marine.		Live Stock, Steam-boiler, Sprinkler Leakage, Inland Transportation, Explosion, and Tornado. (Indicated by Initial letters.)		Total Premiums.	Total Losses.	Unsettled Claims.	
	ıms.	Losses.	Premiums.	Losses.				
1. Ac	32 99	$ 52,693 62	I.T. $ 25 80	*Nil.*	$107,687 79	$ 61,112 45	$ 3,000 00	1
2. All	98 94	137 28	.....	.....	17,255 22	6,254 77	459 00	2
3. All	5 45	337 45	E. 236 25 I.T. 169 68	*Nil.* $25 80	4,097 97	555 40	58 16	3
4. Am	.....	.....	.....	.....	122 76	159 72	*Nil.*	4
5. Am	.....	.....	.....	.....	162 71	*Nil.*	*Nil.*	5
6. The	.....	.....	S.B. 1,508 24	*Nil.*	1,508 24	*Nil.*	*Nil.*	6
7. Bo	59 00	3,379 56	.....	.....	3,459 00	3,379 56	*Nil.*	7
8. Bri	3 85	*Nil.*	.....	.....	24,288 86	10,960 25	2,703 00	8
9. The	5 90	151 55	.....	.....	9,015 90	151 55	*Nil.*	9
10. The	.....	.....	.....	.....	24,668 18	11,966 99	*Nil.*	10
11. The	23 88	711 11	.....	.....	33,705 33	27,644 07	5,214 60	11
12. Bri	.....	.....	.....	.....	9,231 84	1,681 41	*Nil.*	12
13. The	.....	.....	.....	.....	35,582 47	12,441 05	4,273 00	13
14. Ca	.....	.....	.....	.....	542 75	27 95	*Nil.*	14
15. Ca	.....	.....	.....	.....	4,313 79	724 78	90 00	15
16. Th	4 59	25,492 86	.....	.....	13,815 41	3,285 33	*Nil.*	16
17. The	.....	.....	.....	.....	25,564 59	25,492 86	7,373 83	17
18. Ca	.....	.....	.....	.....	1,493 79	2,650 90	*Nil.*	18
19. Co	.....	.....	.....	.....	70,780 33	23,384 49	4,499 30	19
20. Co	.....	.....	T. 99 36	*Nil.*	1,083 16	4,637 89	*Nil.*	20
21. Do	.....	.....	I.T. 497 50	295 76	52,120 70	29,082 40	3,989 50	21
22. Th	.....	.....	.....	.....	89,422 09	27,753 57	*Nil.*	22
23. Th	4 34	13,139 44	.....	.....	36,740 06	13,139 44	*Nil.*	23
24. En	.....	.....	.....	.....	46,048 04	12,821 24	*Nil.*	24
25. Eq	.....	.....	E. 33 30	*Nil.*	167 85	*Nil.*	*Nil.*	25
26. Th	.....	.....	S.B. 1,583 56	*Nil.*	6,278 14	1,249 28	*Nil.*	26
27. Fi	.....	.....	T. 553 82 E. 196 40	*Nil.* *Nil.*	2,145 44	4,480 46	*Nil.*	27
28. Fi	5 06	14,061 42	.....	.....	57,888 21	21,305 53	4,441 74	28
29. Ge	.....	.....	S.B. 139 40	*Nil.*	34,398 66	13,345 28	*Nil.*	29
30. Ge	.....	.....	I.T. 398 15	750 00	2,927 54	954 78	277 00	30
31. Gl	.....	.....	E. 15 60	*Nil.*	551 87	458 10	*Nil.*	31
32. Gl	0 63	3,443 15	E. 3,246 79 I.T. 65 00	19 29	13,493 35	3,553 94	*Nil.*	32
33. Th	.....	.....	.....	.....	45,093 64	17,794 92	6,833 03	33
34. Gr	8 68	4,829 84	T. 1 05 E. 75 19	*Nil.* *Nil.*	42,411 63	27,777 89	4,061 25	34
35. Th	.....	.....	.....	.....	4,607 17	*Nil.*	*Nil.*	35
36. Th	.....	.....	.....	.....	10,057 48	5,982 47	423 75	36
37. Ha	.....	.....	S.L. 225 00 E. 839 85	*Nil.* *Nil.*	8,212 58	2,204 33	*Nil.*	37
38. Hc	.....	.....	S.L. 39 00 E. 486 35	*Nil.* *Nil.*	12,040 21	5,991 08	3,937 00	38
39. Th	.....	.....	.....	.....	17,612 35	12,785 13	3,750 00	39
40. In	5 52	31,427 59	I.T. 903 55 E. 837 50	108 16 *Nil.*	99,294 87	49,457 04	10,241 21	40
41. La	.....	.....	.....	.....	6,439 45	2,773 56	5,000 00	41
42. Th	.....	.....	E. 621 56	*Nil.*	621 56	*Nil.*	*Nil.*	42
43. Th	.....	.....	.....	.....	39,439 67	23,310 70	2,000 00	43

UNIVERSITY OF ILLINOIS LIBRARY

NAME OF COMPANY.	ACCIDENT.		SICKNESS.		LIABILITY.		AUTOMOBILE.		BURGLARY.		GUARANTEE.		PLATE GLASS.		MARINE.		LIVE STOCK, STEAM-BOILER, SPRINKLER LEAKAGE, INLAND TRANSPORTATION, EXPLOSION, AND TORNADO. (Indicated by Initial letters.)		Total Premiums.	Total Losses.	Unsettled Claims.	
	Premiums.	Losses.	Premiums.	Losses.	Premiums.	Losses.	Premiums.	Losses.	Premiums.	Losses.	Premiums.	Losses.	Premiums.	Losses.	Premiums.	Losses.	Premiums.	Losses.				
1. Aetna Insurance Co.							$ 14,579 90	$ 8,418 83									$ 93,082 99	$ 52,693 62	I.T. $ 25 80	Nil.	$107,687 79	$ 61,112 45	$ 3,000 00	1
2. Alliance Assurance Co., Ltd.	$ 673 53	$ 336 90	$ 427 52	$ 254 26	$ 1,382 42	$ 219 00	7,704 74	5,125 10	$ 2,075 68	$ 182 23	$ 1,192 39	Nil.					3,798 94	137 28	E. 236 25	Nil.	17,255 22	6,254 77	459 00	2
3. Alliance Insurance Co. of Philadelphia							916 59	192 15									2,775 45	337 45	I.T. 169 68	$25 80	4,067 97	555 40	88 16	3
4. American Alliance Insurance Co							122 76	159 72													122 76	159 72	Nil.	4
5. American Central Insurance Co							162 71	Nil.													162 71	Nil.	Nil.	5
6. The Boiler Inspection & Insurance Co. of Canada																			S.B. 1,508 24	Nil.	1,508 24	Nil.	Nil.	6
7. Boston Insurance Co.																	3,480 00	3,379 56			3,480 00	3,379 56	Nil.	7
8. British American Assurance Co.							24,376 01	10,960 25									13 85	Nil.			24,389 86	10,960 25	2,703 00	8
9. The British & Foreign Marine Insurance Co., Ltd.																	9,015 80	151 55			9,015 80	151 55	Nil.	9
10. The British Columbia Plate Glass Insurance Co.																								
11. The British Crown Assurance Corporation, Ltd.															$ 24,668 18	$ 11,968 99					24,668 18	11,968 99	Nil.	10
12. British Traders Insurance Co., Ltd.							33,703 33	27,644 07													33,703 33	27,644 07	5,214 60	11
13. The Canada Accident & Fire Assurance Co.	7,499 48	2,591 27	6,273 40	1,991 92	1,150 10	288 37	5,507 96	970 30									3,723 88	711 11			9,231 84	1,681 41	Nil.	12
14. Canada Security Assurance Co.							13,449 72	4,839 60	1,481 39	1,488 01	1,753 50	$ 12 50	3,974 38	1,231 38							35,582 47	12,441 16	4,273 00	13
15. Canadian Fire Insurance Co.							542 75	27 95													542 75	27 95	Nil.	14
16. The Canadian Surety Co.							4,313 79	724 78													4,313 79	724 78	90 00	15
17. The Canton Insurance Office, Ltd.							5,643 35	3,190 70	1,218 01	86 00	6,683 48	Nil.	288 57	9 63							13,833 41	3,286 33	Nil.	16
18. Car & General Insurance Corporation, Ltd	150 00		252 67	12 50			1,091 12	2,638 40									25,564 59	25,492 86			25,564 59	25,492 86	7,373 83	17
19. Continental Casualty Co.	32,747 69	13,112 28	32,958 59	9,037 59	393 00	217 00	4,681 05	1,017 82													1,493 79	2,650 90	Nil.	18
20. Continental Insurance Co.							983 60	4,837 89													70,780 33	23,384 49	4,499 30	19
21. Dominion Gresham Guarantee & Casualty Co.	7,639 01	6,828 70	11,782 12	9,900 07	933 70	Nil.	24,544 83	13,291 60	3,883 21	394 52	2,783 36	401 75	66 97	Nil.					T. 99 36	Nil.	1,083 16	4,687 89	Nil.	20
22. The Dominion of Canada Guarantee & Accident Insurance Co.	41,614 63	8,693 18	20,216 55	10,476 30			20,501 30	5,111 47	955 30	1,170 44	2,212 19	2,164 54	3,922 12	737 64					I.T. 497 50	295 76	52,139 70	29,083 40	3,989 50	21
23. Eagle Star & British Dominions Insurance Co., Ltd.							6,737 70	Nil.													89,422 09	27,732 57	Nil.	22
24. Employers Liability Assurance Corporation, Ltd.	12,796 25	5,266 70			2,746 62	359 50	23,222 08	5,977 29	4,338 67	1,217 75	2,943 62	Nil.					31,014 34	13,139 44			36,740 06	13,139 44	Nil.	23
25. Equitable Fire & Marine Insurance Co.							134 55	Nil.											E. 33 30	Nil.	46,048 04	12,521 24	Dom.	24
26. The Fidelity & Casualty Co.	572 00	50 00	229 45	Nil.	281 44	Nil.	921 02	614 75	1,699 21	Nil.			991 46	584 53					S.B. 1,583 56	Nil.	167 85	Nil.	Nil.	25
27. Fidelity Phenix Fire Insurance Co.	1,395 22	4,480 46																	T. 553 82	Nil.	6,278 14	1,249 28	Nil.	26
28. Fireman's Fund Insurance Co.																			E. 396 40	Nil.				27
29. General Accident Assurance Co. of Canada	1,629 88	302 31	1,246 92	498 02	6,705 37	1,320 18	9,733 15	7,244 11									48,156 06	14,061 42			2,145 44	4,480 46	Nil.	
30. General Animals Insurance Co. of Canada							22,233 66	11,224 77	294 51	Nil.	2,151 92	Nil.							S.B. 139 40	Nil.	57,888 21	21,305 53	4,441 74	28
31. Glens Falls Insurance Co.													5,639 39	204 78					S.B. 139 40	Nil.	54,398 66	13,345 28	Nil.	29
32. Globe & Rutger's Fire Insurance Co.							536 27	488 10											I.T. 398 15	750 00	2,927 54	908 75	277 00	30
33. The Globe Indemnity Co. of Canada	16,340 46	10,161 68	12,900 42	3,425 99	2,397 93	394 69	2,340 93	91 50											E. 15 60		551 87	458 10	Nil.	31
34. Great American Insurance Co.							11,060 50	3,015 92	1,018 24		$ 1,376 09	$ 796 64					7,840 63	3,443 15	E. 2,746 70					
35. The Guarantee Co. of North America																			I.T. 65 00	19 29	13,493 35	3,553 94	Nil.	32
36. The Guardian Insurance Co. of Canada	624 08	1,118 55	562 22	427 28	778 40	140 00	23,386 71	22,948 05													45,093 64	17,794 92	6,833 03	33
37. Hartford Fire Insurance Co.							6,761 11	1,960 36	906 52	2,129 52	220 48		204 67	206 76			13,948 68	4,829 84	T. 1 05	Nil.	45,411 63	27,777 89	4,861 25	34
38. Home Insurance Co.							7,147 73	2,204 33											E. 75 19	Nil.	4,667 17	Nil.	Nil.	35
39. Imperial Guarantee & Accident Insurance Co.	6,816 01	1,089 12	4,788,17	1,451 52	167 85	Nil.	11,514 86	5,901 08													10,057 48	5,982 47	423 75	36
40. Insurance Co. of North America							3,930 21	8,500 50					1,338 13	500 00	605 98	343 99			I.S.L. 225 18	Nil.				37
41. Law Union & Rock Insurance Co., Ltd.	813 39	267 13	507 72	505 71	406 81	Nil.	29,933 30	17,921 29											E. 839 85	Nil.	8,212 58	2,204 33	Nil.	
42. The Liverpool-Manitoba Assurance Co.							3,685 36	1,765 22	335 94	Nil.					689 73	235 50			I.S.L. 39 00					
43. The London & Lancashire Guarantee & Accident Co.	4,016 34	1,083 44	2,656 00	4,617 55	741 88	Nil.	24,670 81	16,567 03	541 48		2,802 93	Nil.	4,010 23	1,062 68					E. 486 35	Nil.	17,612 35	12,785 13	3,750 00	39
44. The London & Lancashire Insurance Co., Ltd.							3,969 62	1,446 92									67,615 52	31,427 59	I.T. 903 55	108 16				
45. London & Provincial Marine & General Insurance Co., Ltd.																			E. 837 50	Nil.	99,294 87	49,457 04	10,241 21	40
46. London Assurance Corporation																					6,439 45	2,773 56	5,000 00	41
47. London Guarantee & Accident Co., Ltd.	11,728 36	18,190 25	4,157 54	4,667 02	1,107 71	Nil.	17,185 28	4,307 25													621 56	Nil.	Nil.	42
48. London Mutual Fire Insurance Co. of Canada							39,691 71	30,824 90			2,760 57	3,111 38					1,754 65	Nil.			39,439 67	21,310 70	2,000 00	43
49. Lloyd Protective Insurance Co.	*13,858 17	19,458 43					8,207 93	6,055 90									7,362 73	442 21			3,009 62	1,446 92	Nil.	44
50. Lumbermen's Mutual Casualty Co.							4,989 30	531 55													54,548 01	5,649 46	1,430 00	45
51. The Marine Insurance Co., Ltd.							706 22	1,538 56													59,443 39	61,793 55	33,633 00	46
52. Maritime Insurance Co., Ltd.															92 69	Nil.			I.T. 2,702 08	Nil.	8,207 93	6,055 90	775 00	47
53. Maryland Casualty Co	640 95	28 57	742 65	526 57	488 90	Nil.	2,904 82	1,651 95	345 19	Nil.	491 80	Nil.	1,187 97	179 77							13,358 17	19,458 43	1,834 00	48
54. Merchants Casualty Co.	52,570 00	18,756 00					1,270 00	140 00											S.L. 127 80	32 05	4,989 30	531 55	132 90	49
55. The Motor Union Insurance Co., Ltd.							34,582 34	8,631 28													3,408 20	1,538 56	105 00	50
56. National Benefit Assurance Co., Ltd.	891 38	186 00	1,441 30	321 65			1,646 03	1,135 55													92 69	Nil.	Nil.	51
57. National Fire Insurance Co. of Hartford							2,836 20	4,931 43											S.L. 127 80	32 05	6,980 08	2,418 91	1,312 00	52
58. National Provincial Plate Glass & General Insurance Co., Ltd																					53,840 00	18,806 00		53
59. National Surety Co.									144 55	Nil.	1,320 38	381 32	1,544 51	347 39							34,062 34	8,631 28	3,961 42	54
60. The Newark Fire Insurance Co.							915 02	82 82													6,773 35	1,722 57	Nil.	55
61. New Jersey Insurance Co.							3,679 86	765 31													2,836 20	4,931 43	728 93	56
62. The New York Plate Glass Insurance Co.															1,349 30	2,831 45					1,544 51	347 39	Nil.	57
63. New Zealand Insurance Co., Ltd.																			F. 2,771 65	Nil.	4,236 58	381 32	2,001 00	58
64. Niagara Fire Insurance Co.							1,551 66	591 33									3,197 53	1,176 66			915 02	82 82	Nil.	59
65. The North American Accident Insurance Co.	2,777 45	1,952 50	638 08	23 31	243 08	9 15	1,506 39	891 32	68 32	Nil.			6,514 36	108 59			37,521 58	7,492 63	E. 1 42		3,679 86	765 31	228 14	60
66. Northern Assurance Co., Ltd.	1,487 34	413 56	924 52	1,091 56	102 50	61 50	8,789 59	2,737 97			535 42		1,999 30	106 84							1,349 30	2,831 45	58 00	61
67. Northwestern Mutual Fire Association							5,465 78	2,834 64							6,402 69	179 07					39,074 68	8,084 48	2,095 00	62
68. Northwestern National Insurance Co.							199 65	2,157 62													11,747 68	2,954 87	2,774 00	63
69. Norwich Union Fire Insurance Society, Ltd.							10,671 55	3,357 37													20,166 36	4,590 50	Nil.	64
70. Occidental Fire Insurance Co.							5,174 33	1,748 89													8,452 34	2,854 64	190 00	65
71. The Ocean Accident & Guarantee Corporation, Ltd.	9,460 44	2,290 65	4,489 49	1,793 68	2,415 85	1,932 01	9,348 12	2,902 09	536 91	291 82	1,031 81	Nil.	6,171 14	1,310 45							199 65	2,157 62	Nil.	66
72. Ocean Marine Insurance Co., Ltd.																					32,758 85	13,500 99	4,365 00	67
73. The Pacific Marine Insurance Co.							2,542 62	368 43									1,631 99	61 70			5,174 33	1,748 89	Nil.	68
74. The Palatine Insurance Co., Ltd.							4,485 99	220 55													33,453 71	10,220 70	5,805 00	69
75. The Phoenix Insurance Co. of Hartford							29,013 08	15,504 67							10,102 30	7,997 38					1,631 99	61 70	Nil.	70
76. The Preferred Accident Insurance Co. of N.Y.							179 50	Nil.											E. 109 27		2,542 62	368 43	25 00	71
77. The Protective Association of Canada	*13,194 53	7,437 89																			4,485 99	220 55	30 00	72
78. Queen Insurance Co. of America							3,230 17	6,353 31													30,925 28	23,498 65	1,100 25	73
79. Quebec Fire Insurance Co., Ltd.																					179 50	Nil.	835 50	74
80. Railway Passengers Assurance Co.															9,801 62	1,012 11					13,194 53	7,437 89	Nil.	75
81. Reliance Marine Insurance Co. †	7,856 09	2,148 78	4,412 20	1,528 25	1,218 57	3,065 40	19,240 79	7,739 65	287 80	218 50	91● 11	1,000 00	1,760 36	442 33							3,230 17	6,353 31	Nil.	76
82. The Railway Passengers Assurance Co.															9,801 62	1,012 11					9,801 62	1,012 11	Nil.	77
83. Reliance Marine Insurance Co. †	2,820 50	673 12															15,215 00	36,080 00			35,687 72	16,142 91	2,110 00	78
84. Royal Exchange Assurance	640 50	42 49	560 92	187 60			8,066 74	5,331 01													2,820 50	673 12	160 02	79
85. Royal Fire & Marine Insurance Co.							484 59	257 15					4,386 28	1,882 78							8,128 25	5,093 09		80
86. Scottish Metropolitan Assurance Corporation, Ltd.	5,212 86	721 87	5,511 27	2,165 43	999 04	Nil.	6,239 76	3,208 03							9,619 30	5,872 72					4,386 28	1,882 78	88 98	81
87. Scottish Union & National Insurance Co.							13,432 27	10,364 77											T. 1 06	Nil.	10,819 84	6,224 25	8,541 59	82
88. Standard Marine Insurance Co., Ltd																			I.T. 714 90	594 38	17,962 93	6,005 38	495 00	83
89. Tokio Marine & Fire Insurance Co., Ltd.																					13,432 27	10,364 77	2,390 00	84
90. The Travelers Indemnity Co.	1,677 15	912 71	7,670 79	9,960 87											11,783 21	5,078 04					11,783 21	5,078 04	Nil.	85
91. The Travelers Insurance Co.	13,710 92	1,357 13													5,458 68	161 97					5,458 68	161 97	Nil.	86
92. Union Assurance Society, Ltd.							4,335 19	487 48													9,347 94	10,873 88	Nil.	87
93. Union Fire & Casualty Co.	*20,103 00	2,116 98					4,523 45	1,213 23			622 25	Nil.									13,759 09	1,357 13	Nil.	88
94. Union Insurance Society of Canton, Ltd.							7,213 18	2,962 52							11,126 01	6,348 90					4,335 19	487 48	Nil.	89
95. The Union Marine Insurance Co., Ltd.							4,545 85	Nil.							53 42	Nil.					23,248 70	3,330 21	Nil.	90
96. United States Fidelity & Guaranty Co.	*2,569 57	533 10			4,194 18	562 50	1,740 19	472 11	4,253 11	1,209 34	9,265 49	21,385 79	3,430 76	1,115 09							13,359 19	2,211 42	Nil.	91
97. United States Fire Insurance Co. †																					4,699 27	Nil.	Nil.	92
98. United States Lloyds, Inc.																	1,305 39	1,207 92			25,453 30	25,329 03	59,256 35	93
99. Western Assurance Co.							25,284 44	8,726 44									17,071 01	74,728 38	E. 329 67	Nil.	1,305 39	1,207 92	Nil.	94
100. The Western Casualty Co.	*18,668 95	6,910 30																	I.T. 405 41	511 63	43,590 53	83,966 44	1,690 19	95
101. The World Marine & General Insurance Co. Ltd.																	5,617 78	230 98			18,668 95	6,910 30	570 00	96
102. The Yang-tsze Insurance Association, Ltd.																	21,923 45	10,701 67			5,617 78	230 98	500 00	97
103. The Yorkshire Insurance Co., Ltd.	9,150 82	16,614 96	7,233 61	2,624 60	626 00	326 47	715 50	Nil.					756 09	136 68					L.S. 885 55	800 00	21,923 45	10,701 67	Nil.	98
																					19,367 57	20,502 71	944 10	99
Totals	$334,366 05	$160,814 43	$141,607 92	$ 71,850 15	$ 30,085 70	$ 10,123 14	$648,800 55	$346,525 53	$ 24,384 34	$ 8,387 63	$ 47,008 09	$ 28,753 92	$ 73,177 19	$ 25,106 03	$488,845 50	$306,157 78	$ 21,346 70	$ 3,137 06			$1,807,622 04	$960,855 67	$219,458 74	100

* Accident and sickness.

RETURN TO DECEMBER 31ST, 1921, OF PROVINCIAL LICENSEES, OTHER THAN MARINE INSURANCE COMPANIES.

ASSETS.

Name of Company.	Real Estate.	Mortgages.	Bonds, Stocks, and Loans.	Interest accrued.	Outstanding Premiums and Agents' Balances.	Cash in Office or on Deposit.	All other Assets.	Total.
1. British Columbia Plate Glass Insurance Co			$ 20,471 93	$ 133 26	$ 7,121 30	$ 2,023 98	$ 3,834 54	$ 33,585 01
2. Royal Plate Glass Insurance Co		$ 4,250 00	7,060 73	54 76	1,032 37	183 39	1,242 72	13,823 97
3. Union Fire and Casualty Co	$ 4,552 20	13,550 00	135,748 76	4,877 78	96,298 79	7,650 47	31,354 54	294,032 54
4. Wawanesa Mutual Insurance Co	16,763 91		316,900 00	3,286 05	83,298 13	88,223 84		508,471 93
5. Western Empire Life Assurance Co	15,319 60	68,871 12	338,936 26	15,635 46	94,055 93	16,283 82	170,935 51	720,037 70
Totals	$36,635 71	$86,671 12	$819,117 68	$23,987 31	$281,806 52	$114,365 50	$207,367 31	$1,569,951 15

LIABILITIES.

Name of Company.	Unpaid Losses.	Unearned Premiums.	Other Reserves.	Other Liabilities.	Total except Paid-up Capital.	Capital Stock paid-up.	Total including Paid-up Capital.
1. British Columbia Plate Glass Insurance Co		$ 22,244 32			$ 22,244 32	$ 3,840 00	$ 26,084 32
2. Royal Plate Glass Insurance Co	$ 88 98	4,142 46		$ 73 73	4,305 17	2,750 00	7,055 17
3. Union Fire and Casualty Co	45,837 83	76,454 87	$29,000 38	53,392 76	204,685 84	100,505 55	305,191 39
4. Wawanesa Mutual Insurance Co	115,252 12				115,252 12		115,252 12
5. Western Empire Life Assurance Co	26,746 73	421,577 00		3,186 25	451,509 98	209,610 40	660,120 38
Totals	$187,925 66	$524,418 65	$29,000 38	$56,652 74	$797,997 43	$316,705 95	$1,113,703 38

RECEIPTS.

Name of Company.	Premiums.	Interest.	Calls on Capital Stock.	All other Receipts.	Total.
1. British Columbia Plate Glass Insurance Co	$ 24,668 18	$ 1,029 97		$ 607 21	$ 26,305 36
2. Royal Plate Glass Insurance Co	5,185 87	565 00			5,750 87
3. Union Fire and Casualty Co	312,633 61	8,578 48		26,712 46	347,924 55
4. Wawanesa Mutual Insurance Co	322,481 15	18,534 27		464 04	341,479 46
5. Western Empire Life Assurance Co	143,064 50	30,162 00	$9,944 35	29,948 24	213,119 09
Totals	$808,033 31	$58,869 72	$9,944 35	$57,731 95	$934,579 33

EXPENDITURE.

Name of Company.	Expenses of Management.	Losses paid.	Dividends.	All other Expenditure.	Total.
1. British Columbia Plate Glass Insurance Co	$ 10,146 71	$ 12,537 70	.....	$ 40 58	$ 22,724 99
2. Royal Plate Glass Insurance Co	1,574 83	2,211 54	.....	.....	3,786 37
3. Union Fire and Casualty Co	223,486 84	139,989 82	$5,000 00	33,412 71	401,889 37
4. Wawanesa Mutual Insuraace Co	126,322 48	221,109 55	.....	4,515 18	351,947 21
5. Western Empire Life Assurance Co	91,243 81	21,919 05	284 48	18,442 00	131,889 34
Totals	$452,774 67	$397,767 66	$5,284 48	$56,410 47	$912,237 28

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VICTORIA, B.C.

Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.

1922.

DEPARTMENT OF PROVINCIAL SECRETARY

ANNUAL REPORT

OF THE

MENTAL HOSPITALS

OF THE

PROVINCE OF BRITISH COLUMBIA

FOR 12 MONTHS ENDING MARCH 31ST

1922

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1922.

Recreation-ground, New Westminster.

Mental Hospital, New Westminster.

To His Honour WALTER CAMERON NICHOL,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

The undersigned respectfully submits herewith the Annual Report of the Medical Superintendent of the Mental Hospitals for the fiscal year ending March 31st, 1922.

J. D. MACLEAN,
Provincial Secretary.

Provincial Secretary's Office.

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DEPARTMENT OF PROVINCIAL SECRETARY.

Hon. J. D. MacLean, *Povincial Secretary.* J. L. White, *Deputy Provincial Secretary.*

OFFICERS AND STAFF, MENTAL HOSPITALS.

H. C. Steeves, B.A., M.D., C.M., *General Medical Superintendent.*

OFFICERS AT NEW WESTMINSTER.

Medical Staff:

E. J. Ryan, M.D., C.M., *Assistant Medical Superintendent.*

T. W. McAllister, M.D., *Assistant Physician.* Gwendolyn Kellington, *Analyst.*

Clerical Staff:

Gowan S. Macgowan, *Bursar.* Thos. H. Cambridge, *Receiving Clerk.*
F. Gillard, *Clinical Clerk and Stenographer.*
J. F. O'Reilly, *Steward.* Violet Stead, *Clinical Stenographer.*

Chaplains:

Rev. F. W. Auvache, Protestant. Rev. Father Beck, Roman Catholic.

Nursing Staff:

Miss M. Fillmore, *Matron and Supervisor of Nurses.* F. Spooner, *Chief Attendant.*

OFFICERS OF ESSONDALE AND COLONY FARM.

Medical Staff:

A. L. Crease, M.D., C.M., *Assistant Medical Superintendent and Pathologist.*
L. E. Sauriol, M.D., *Assistant Physician.* P. S. Tennant, M.D., *Assistant Physician.*

Clerical Staff:

Gowan S. Macgowan, *Bursar.* C. Fletcher, *Chief Clerk.* M. H. McCabe, *Book-keeper.*
John Pumphrey, *Steward.* Ethel Gregg, *Stenographer.*
F. J. Fish, *Clinical Clerk and Stenographer.* I. H. Wedge, *Clinical Stenographer.*

Chaplains:

Rev. A. B. Lane, Protestant. Rev. Father Pare, Roman Catholic.

Nursing Staff:

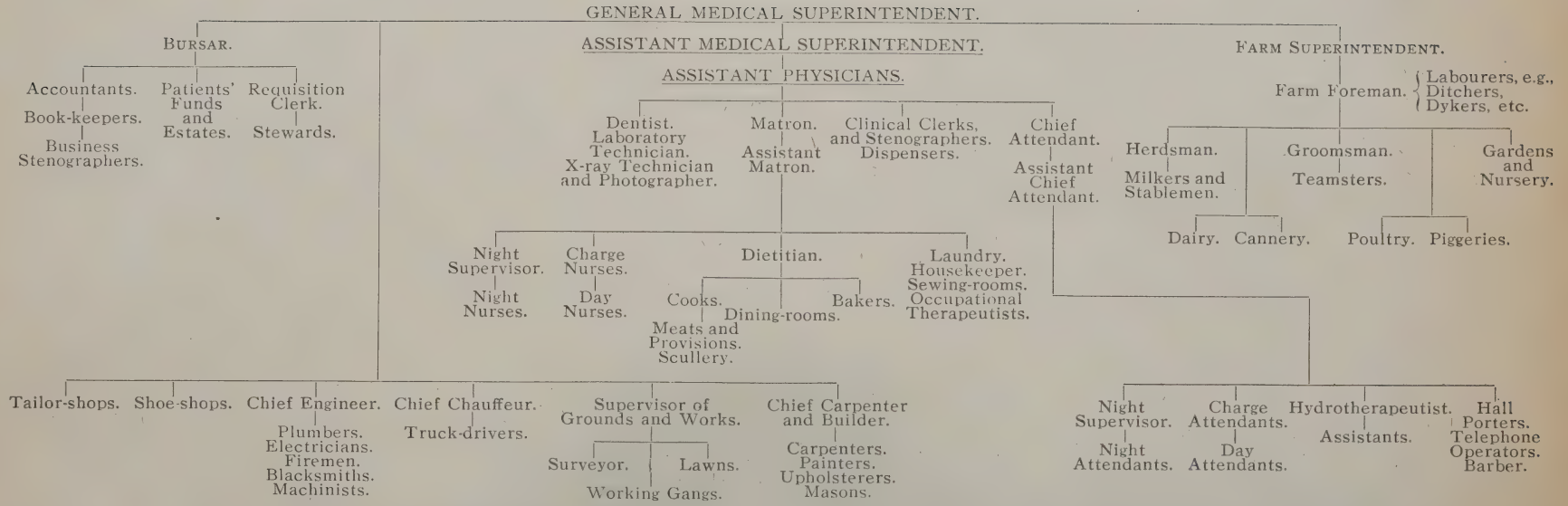
Gilbert Mathewson, *Chief Attendant.* M. Doyle, *Assistant Chief Attendant.*
M. Fillmore, *Matron and Supervisor of Nurses.*

Colony Farm:

P. H. Moore, B.A., B.S.A., *Farm Superintendent.*
T. Weeks, *Record Clerk.* R. Gardner, *Foreman.*

OFFICERS OF MENTAL HOME, COLQUITZ.

George Hall, M.D., C.M., *Visiting Physician.*
Granby Farrant, *Managing Supervisor.* Harry Hoult, *Chief Attendant.*


GENERAL MEDICAL SUPERINTENDENT.
BURSAR.
Accountants.
Book-keepers.
Business Stenographers.
Patients' Funds and Estates.
Requisition Clerk.
Stewards.
ASSISTANT MEDICAL SUPERINTENDENT.
ASSISTANT PHYSICIANS.
Dentist.
Laboratory Technician.
X-ray Technician and Photographer.
Matron.
Assistant Matron.
Clinical Clerks, and Stenographers.
Dispensers.
Chief Attendant.
Assistant Chief Attendant.
Night Supervisor.
Night Nurses.
Charge Nurses.
Day Nurses.
Dietitian.
Cooks.
Meats and Provisions.
Scullery.
Dining-rooms.
Bakers.
Laundry.
Housekeeper.
Sewing-rooms.
Occupational Therapeutists.
FARM SUPERINTENDENT.
Farm Foreman.
Labourers, e.g., Ditchers, Dykers, etc.
Herdsman.
Milkers and Stablemen.
Groomsman.
Teamsters.
Gardens and Nursery.
Dairy.
Cannery.
Poultry.
Piggeries.
Tailor-shops.
Shoe-shops.
Chief Engineer.
Plumbers.
Electricians.
Firemen.
Blacksmiths.
Machinists.
Chief Chauffeur.
Truck-drivers.
Supervisor of Grounds and Works.
Surveyor.
Lawns.
Working Gangs.
Chief Carpenter and Builder.
Carpenters.
Painters.
Upholsterers.
Masons.
Night Supervisor.
Night Attendants.
Charge Attendants.
Day Attendants.
Hydrotherapeutist.
Assistants.
Hall Porters.
Telephone Operators.
Barber.

REPORT OF THE MEDICAL SUPERINTENDENT

For the Twelve Months ending March 31st, 1922.

PART I.—MEDICAL.

NEW WESTMINSTER, B.C., August 16th, 1922.

The Honourable the Provincial Secretary,
Parliament Buildings, Victoria, B.C.

SIR,—I have the honour to submit herewith the Fiftieth Annual Report of the Mental Hospitals of British Columbia, which is a report of the Hospital operations for the fiscal year ending March 31st, 1922.

There were resident in the various departments of the Hospital at the beginning of the year 1,566 patients, of which 1,122 were males and 444 females. In addition to those in residence, there were on probationary trial in the care of friends and still under the Hospital supervision 93 patients, making a total of 1,659 patients under Hospital supervision at the beginning of the year.

During the year 478 new patients were admitted, 308 male and 170 female, thus making a total of 2,137 patients under treatment and supervision during the year.

Discharges, deaths, and escapes during the year total 488, of which 298 were males and 190 females, leaving in residence at the close of the year under review 1,649. We have, therefore, a net increase of patients in residence at the end of the year of 83. I wish to especially bring this to your attention, as it must impress you with the urgent need of relieving as rapidly as possible the crowded condition of the Hospitals brought about by the interruption of the building programme by the war.

The tables (1–21) appended cover all details in connection with patients and provide some very interesting information when analysed. A reference to Table 7 shows that of the total of 478 admitted only 172, or 35.90 per cent., were Canadian born, the remainder coming from almost every other country in the world. These figures must impress the necessity of a very careful supervision of persons entering our country if the results hoped for from immigration are to be obtained. In this connection I have added Table 21 to the report, showing the number of patients successfully deported during the year, the country to which they were returned, the length of residence in Canada prior to admission, and the residence in Hospital before deportation could be carried out. Much very valuable information can be gleaned from the figures in this table if one considers the costs involved in dealing with these cases.

During the year every effort has been made to keep up active treatment and keep in touch with all the advances in treating the insane. I feel that the results obtained have been creditable when it is remembered that a department of this Hospital cares for feeble-minded and they are included in our statistics as well as the actual insane.

During the year 96 patients were discharged recovered and 135 improved, a total of 231, or 48.3 per cent. of our admissions cured or helped by the Hospital. In addition, there were 43 patients discharged as unimproved, either going to other institutions or private care; a total of 57.32 per cent. of discharges to admissions, not including deaths. The general health of the Hospital population has been good, no epidemic of disease making its appearance. Deaths totalled 114, or 5.33 per cent. of the total number under treatment, and represents one of the lowest death-rates in the history of the Hospital. There have been no suicidal or accidental deaths during the year, a fact which speaks well for the diligence and care of the nursing staff, as we have among our population some very persistent and actively suicidal cases.

The types of mental disease exhibited in the cases admitted during the year is shown in Table 16. Here we are impressed with the preponderance of the manic depressive and dementia præcox psychosis, these alone constituting 49.7 per cent. of all admissions. These are the types

in which heredity and hereditary predisposition are so frequently found and the types which occur at that time in life when stress is greatest. Those who enter the game of life handicapped by poor heredity break under the responsibilities incident to progress, and we find (Table 10) the admissions gradually increasing for each five-year period of age up to 40, where the peak-load of business and family worry may be considered to be reached. This point passed and the curve again diminishes as the responsibilities lighten and ambitions are attained.

General paresis accounted for 20, or 4.1 per cent. of the admissions. This form of mental illness, due only to syphilis, could have been prevented by effective treatment in the early stages of the infection and a most distressing and fatal disease, as well as the economic loss incident to illness and treatment, avoided. It seems most important that the public should be made familiar with the necessity of serious and prolonged treatment of venereal disease. Idiocy and imbecility were responsible for the admission of 57 patients. This amounts to 11.9 per cent. of our total admissions and points out the seriousness of the need for steps to be taken to provide additional accommodation for this class of patient. Our present building for the feeble-minded is long since filled to maximum capacity and these cases are now overflowing into our general wards, a condition most undesirable from every point of view. In my recommendations I will refer again to this matter.

I would also direct attention to Tables 18A and 18B, which show clearly that the best results are obtained in those cases brought to Hospital in the early stages of illness. Those cases ill less than one month show by far the greatest number of recoveries and so point to the imperative need for early treatment in mental illness. Any steps which can be taken to familiarize the public with the work and results of the modern mental hospital and to dissipate the old traditions so fixed in the minds of many will react most favourably in building up a confidence in the Hospital and materially aid in the results of its work.

REPAIRS AND EXTENSIONS.

Work in the mechanical departments has been carried on actively during the year, with the result that the buildings and equipment of the Hospital are in good condition generally.

The report of Mr. Lonsdale, chief carpenter at Essondale, and Mr. Hall, chief carpenter at the Public Hospital for Insane, shows much work accomplished during the year, and I wish to officially express my appreciation of their work.

At the Public Hospital for Insane a new building 60 by 100 feet, two stories, was erected for the proper housing of steward's stores and to provide additional accommodation for occupational therapy. This building has added much to the successful operation of the Hospital. The repairing and upholstering of furniture has been carried on more extensively than formerly; during the year 121 pieces of furniture being renewed.

Several rather extensive repair and renewal jobs have been completed in various wards of the Hospital in an effort to keep the buildings in as hygienic and suitable condition as possible.

At Essondale the Carpentry Department has accomplished a good year's work. A root-house, 36 by 130 feet, one and a half stories, was completed at Colony Farm. Three bull-sheds, 14 by 14 feet, with concrete floors. Three five-room cottages with half-basement were erected for employees. Remodelled isolation-barn to horse-barn, removing old fittings, changing floors, and installing suitable fittings to accommodate horses; now a splendid barn. A machine-shop, 20 by 32 feet, erected to accommodate pressing needs for temporary room to carry on this work.

General repairs were constantly carried on in all buildings and they have been kept in good condition.

The painters have been actively engaged in cleaning and painting wards of the Hospital and painting new buildings as completed.

In the Engineering Department much necessary work has been carried on. A very trying emergency was energetically and successfully met by Mr. Malcolm at Essondale and Mr. Johnson at the Public Hospital for Insane, when, through flooding of the Coquitlam River, the water-supply to both Hospitals was destroyed. In a very short time, by the active co-operation of the whole staff, a water service was installed which carried the Hospitals through a period of four months without serious shortage or discomfort. The flood also made necessary extensive repairs to motors and pumps. These are again in good condition.

The completion of telephone, water, heating and lighting installation for the Boys' Industrial School was also carried out by this department during the year. The general repairs to heating,

plumbing, laundry machinery, and machinery generally have been carried on by this department and entailed a very considerable amount of work.

The Tailoring Department has also been carried on successfully; all staff uniforms were manufactured as well as a large amount of clothing for patients dependent upon the Hospital.

The shoe-shop has also been operated successfully during the year, carrying on extensive repair-work and making considerable new stock as well as special footwear for deformed and crippled patients who needed special attention of this kind.

A new X-ray equipment has been purchased and will be installed in the space formerly occupied by the Steward at the Public Hospital for Insane as soon as necessary alterations can be made. This will prove a great benefit to the institution, as formerly it was necessary to send patients to the General Hospital for X-ray service. As a result only the urgent cases were sent out and a valuable diagnostic aid often lost.

Much improvement-work has been carried on at the Mental Home at Colquitz, as a result of which the buildings and grounds are in a much more satisfactory condition than formerly and reflect much credit on the Supervisor and his staff.

COLONY FARM DEPARTMENT.

I am pleased to record the return of Mr. P. H. Moore to Colony Farm as Farm Superintendent.

The work of the farm suffered severe reverses owing to the Coquitlam flood and only after many months of hard work have necessary repairs been made. The loss from this source was severe indeed and can only be estimated. Fortunately there was no loss of stock, largely owing to the tireless efforts of the staff on the farm.

The inventory of stock shows a satisfactory condition, though the necessary revaluation owing to falling markets makes it appear that we had suffered severe financial loss.

For all details of this department I would refer you to the section of the report containing the Farm Superintendent's report and detail tables of all operations.

FINANCIAL DEPARTMENT.

The Bursar's report, together with balance-sheets and financial tables, show in complete detail the finances of the Hospital for the year.

I would especially direct your attention to the fact that, although more patients were treated than ever before, we were able to carry on the work for $44,000 less than last year and were successful in reducing the daily net *per capita* cost from 93⅓ cents last year to 80⅔ cents for the period of this report. This was accomplished in the face of a diminished revenue from estates and maintained patients, although every effort was made to collect maintenance wherever possible.

I feel that a study of the volume of work done and the generally satisfactory condition of the buildings and equipment makes the net cost a very satisfactory one indeed.

RECOMMENDATIONS.

I would most especially recommend the continuance of active construction of modern suitable buildings at Essondale to care for the whole Mental Hospital requirements. I need only say that the population of the Hospital has grown from 752 in 1912, when the last building was completed, to 1,649 in 1922 to impress upon you the greatly crowded state of the institution at the present time.

The buildings at New Westminster are increasingly more difficult and expensive to keep in repair and, even when the best possible is accomplished, are obsolete and unsuited for the care of insane as practised to-day.

In bringing together at one place the entire organization a great deal could be saved in the elimination of duplications in staff and equipment and much more satisfactory administration could be carried out.

The temporary building for the care of feeble-minded children is overcrowded at present and these cases are again overflowing into the general wards of the institution. This is a very unsatisfactory condition and should be remedied as quickly as possible. It is my opinion that the old buildings at New Westminster should be rebuilt as conditions will permit and a suitable institution for the feeble-minded be carried on there entirely separate from the insane.

The growth of the institution has brought about the necessity for additional shop-room. This can be accomplished very satisfactorily by remodelling the interior of the old shops building at a very moderate cost, and I would recommend that funds be provided for this work during the next year.

After very considerable study of the feasibility of operating a cannery satisfactorily to care for fruit and vegetable crops and give a more economical and better-balanced diet to our patients, I have no hesitation in recommending that this step be taken as soon as possible.

The building of homes for Medical Officers at Essondale is very essential indeed. At the present time there is accommodation for only one married physician. It is almost impossible to get single men to fill staff appointments and impossible to hold them on the staff if facilities are not provided to follow natural instincts and have a home. We cannot expect to get and keep efficient officers if these facilities are not available. There is urgent need for the erection of three suitable houses for this purpose at a very early date.

The continuation of the erection of homes for employees is also very desirable and should be provided for as conditions will permit.

The time has arrived when we must again enlarge our medical staff to keep pace with the growth of our population and provisions should be made to meet this need as soon as possible. Much important work could be carried on had we sufficient medical staff to take it up.

ACKNOWLEDGMENTS.

I wish to make official acknowledgment of the valuable assistance of the Assistant Medical Superintendents in carrying on the treatment of patients and the general supervision of the Hospitals. Without their hearty co-operation my task would have been almost impossible. I am also indebted to the physicians for loyal and diligent service.

The heads of all departments of the institution have been most diligent and shown a splendid interest in successfully carrying on the Hospital, and I feel that much of our success during the year has been due to this splendid spirit.

In closing this report, allow me to make grateful acknowledgment of your ready understanding and appreciation of our institution problems and needs and your kind consideration and support during the year.

I have the honour to be,
Sir,
Your obedient servant,
H. C. STEEVES,
Medical Superintendent.

LABORATORY REPORT.

PROVINCIAL MENTAL HOSPITAL,
ESSONDALE, B.C., August 14th, 1922.

Dr. H. C. Steeves,
Medical Superintendent, Public Hospital for Insane,
New Westminster, B.C.

SIR,—I have the honour to submit herewith report of work done in Laboratory during the year ended March 31st, 1922.

The report will show that the work accomplished this year is less than that done during the previous year. Miss Shepherd, the former Laboratory Technician, resigned on August 31st, 1921, and her position was not filled until December 1st, 1921, when Miss Kellington took up her duties as assistant, and since that time the work of the Laboratory has been continued.

Of the number of tests for syphilis, 26 show as positive, a percentage of approximately 8, showing no change from the percentage of last year's results.

Laboratory-work done from April 1st, 1921, to March 31st, 1922.

Urinalyses—	
Routine	188
Blood—	
Wassermann test for syphilis	322
Blood-counts—	
Complete	10
White and differential counts	10
Spinal fluid—	
Wassermann tests	12
Globulin	6
Cell-counts	6
Cultures—	
Throat	4
Nose	3
Sputa examination for tuberculosis	8
Examination of fæces	2
Smears—	
Urethral for Gc	3
Complement-fixation test for *Bacillus abortus*	72
Agglutination test for *Bacillus abortus*	110
Bacterial counts on milk	8

I have, etc.,
A. L. Crease, M.D., C.M.,
Assistant Medical Superintendent and Pathologist.

DENTAL REPORT.

Public Hospital for the Insane,
New Westminster, B.C.

Medical Superintendent,
Public Hospital for the Insane,
New Westminster B.C.

Sir,—I beg to report the following dental work on patients in the Mental Hospitals, New Westminster and Essondale, during the year from April 1st, 1921, to March 31st, 1922, inclusive:—

Extractions	431
Amalgam fillings	71
Cement fillings	8
Synthetic	3
Scaling and cleaning	64
Pyorrhœa treatments	4
Dentures	8
Repairing dentures	4
Resetting bridge	1
Trimming plate	11
Bridge removed	1
Alveolotomy	1
Abscess treated	1

I have, etc.,
F. P. Smith, D.D.S.,
Visiting Dentist.

STATISTICAL TABLES.

TABLE No. 1.—SHOWING THE OPERATIONS OF THE HOSPITALS, NEW WESTMINSTER, ESSONDALE, AND SAANICH, FROM APRIL 1ST, 1921, TO MARCH 31ST, 1922.

Movement of Population.	Male.	Female.	Total.	TOTAL.		
				Male.	Female.	Total.
In residence, New Westminster, March 31st, 1921	168	410	578			
" Essondale, March 31st, 1921	840	34	874			
" Saanich, March 31st, 1921	114	..	114			
On probation, carried forward from 1920–21, New Westminster	10	40	50			
" " " Essondale	32	1	33			
" " " Saanich	3	..	3			
Escaped, carried forward from 1920–21, New Westminster	..	..	..			
" " Essondale	7	..	7			
" " Saanich	..	..	..			
				1,174	485	1,659
Admitted during the year 1921–22—						
By ordinary forms	273	166	439			
By urgency forms	20	3	23			
By voluntary	12	..	12			
From the Yukon	1	1	2			
Order in Council	2	..	2			
				308	170	478
Total under treatment, New Westminster, Essondale, and Saanich, April 1st, 1921, to March 31st, 1922	..	..	..	1,482	655	2,137
Discharged during period April 1st, 1921, to March 31st, 1922:						
(*a.*) From New Westminster—						
As recovered	21	56	77			
As improved	29	37	66			
As unimproved	6	9	15			
Not insane	2	2	4			
On probation and still out	17	43	60			
Escaped, but not discharged	..	..	..			
Died	26	37	63			
	101	184	285			
(*b.*) From Essondale—						
As recovered	19	..	19			
As improved	63	2	65			
As unimproved	24	2	26			
Not insane	1	..	1			
On probation and still out	26	1	27			
Escaped, but not discharged	6	..	6			
Died	48	1	49			
	187	6	193			
(*c.*) From Saanich—						
As improved	4	..	4			
As unimproved	2	..	2			
Not insane	2	..	2			
Died	2	..	2			
	10	..	10			
Total discharged from New Westminster, Essondale, and Saanich	..	..	..	298	190	488
Total in residence, New Westminster, Essondale, and Saanich	..	..	..	1,184	465	1,649
New Westminster—						
Total on books, March 31st, 1921	178	450	628			
Admissions during 1921–22	308	170	478			
Returned from Essondale	25	6	31			
Returned from Saanich	1	..	1			
				512	626	1,138
Discharged during 1921–22	101	184	285			
Transferred to Essondale	232	11	243			
Transferred to Saanich	11	..	11			
				344	195	539
Total in residence, New Westminster, March 31st, 1922	..	..	..	168	431	599

TABLE NO. 1.—SHOWING THE OPERATIONS OF THE HOSPITALS, NEW WESTMINSTER, ESSONDALE, AND SAANICH, FROM APRIL 1ST, 1921, TO MARCH 31ST, 1922—*Continued.*

Movement of Population.	Male.	Female.	Total.	TOTAL.		
				Male.	Female.	Total.
Essondale—						
Total on books, March 31st, 1921	879	35	914			
Transferred from New Westminster	232	11	243			
				1,111	46	1,157
Discharged during the year 1921-22	187	6	193			
Returned to New Westminster	25	6	31			
Transferred to Saanich	9	..	9			
				221	12	233
Total in residence, Essondale, March 31st, 1922	..	..	..	890	34	924
Saanich—						
Total on books, March 31st, 1921	117	..	117			
Transferred from New Westminster	11	..	11			
Transferred from Essondale	9	..	9			
				137	..	137
Discharged during the year 1921-22	10	..	10			
Returned to New Westminster	1	..	1			
				11	..	11
Total in residence, Saanich, March 31st, 1922	..	..	..	126	..	126
Total in residence, New Westminster, March 31st, 1922	168	431	599			
Total in residence, Essondale, March 31st, 1922	890	34	924			
Total in residence, Saanich, March 31st, 1922	126	.	126			
Grand total in residence, New Westminster, Essondale, and Saanich, March 31st, 1922	..	..	..	1,184	465	1,649

TABLE No. 2.—SHOWING IN SUMMARY FORM THE OPERATIONS OF THE HOSPITAL SINCE ITS INCEPTION.

Year.	Admissions.	Discharges.		Deaths.	Number Resident at the Close of each Year.	Increase.	Decrease.	Whole Number treated.	Percentage of Recoveries to Admissions.	Percentage of Discharges to Admissions (Deaths excluded).	Percentage of Deaths to Whole Number under Treatment.
		Recovered.	Not recovered.								
1872	18	1	..	1	16	..	..	18	5.55	5.55	5.55
1873	15	10	2	5	14	..	2	31	66.66	80.00	16.12
1874	12	4	..	3	19	5	..	26	33.33	33.33	11.53
1875	29	3	3	10	32	13	..	48	10.34	26.89	20.83
1876	22	11	3	5	35	3	..	54	50.00	63.63	9.35
1877	14	4	4	3	38	3	..	49	28.57	78.57	6.12
1878	16	7	3	8	36	..	2	54	43.75	62.50	16.16
1879	18	4	1	8	41	5	..	54	22.22	27.77	14.81
1880	17	5	..	5	48	7	..	58	29.41	29.41	8.62
1881	13	5	3	5	48	..	..	61	38.46	61.54	8.19
1882	7	3	1	2	49	1	..	55	42.85	57.14	3.63
1883	8	4	1	3	49	..	..	57	50.00	62.50	5.26
1884	10	2	4	2	51	2	..	59	20.00	60.00	3.33
1885	20	5	..	5	61	10	..	71	25.00	25.00	6.94
1886	27	10	6	6	66	5	..	88	37.03	59.25	6.81
1887	36	15	5	5	77	11	..	102	41.66	55.55	4.80
1888	26	12	6	3	82	5	..	103	46.15	69.23	2.87
1889	41	14	5	4	100	18	..	123	34.15	46.34	3.25
1890	52	17	6	12	117	17	..	152	32.69	44.23	7.64
1891	49	19	4	20	123	6	..	166	38.77	46.94	11.69
1892	52	17	10	13	135	12	..	175	32.69	51.92	6.95
1893	44	14	18	14	133	..	2	179	31.81	72.72	7.60
1894	80	13	19	19	162	29	..	213	16.25	40.00	8.92
1895	62	29	11	20	164	2	..	224	46.77	64.51	8.92
1896	64	23	25	9	171	7	..	228	35.93	75.00	3.94
1897	74	20	8	14	203	32	..	246	27.03	37.83	5.69
1898	81	27	13	19	221	18	..	285	33.33	49.38	6.66
1899	101	31	32	21	234	13	..	327	30.69	62.37	6.42
1900	113	38	27	29	258	24	..	356	33.63	57.52	8.14
1901	115	40	20	25	284	26	..	377	34.78	52.17	6.63
1902	121	30	31	25	311	27	..	413	24.79	50.41	6.06
1903	139	38	37	26	349	38	..	466	27.34	53.96	5.57
1904	115	46	26	26	321	..	28	480	40 00	62.61	5.42
1905	123	43	33	27	348	27	..	505	33.33	61.78	5.34
1906	150	36*	43	28	388	43	..	552	23.03	52.06	5.04
1907	221	48	43	39	461	73	.	666	21.30	41.20	5.08
1908	230	68*	56	57	507	46	..	765	28.30	53.90	7.44
1909	232	73†	77	40	536	29	..	816	31.00	64.60	6.40
1910	280	84	82	41	595	48	..	896	30.00	59.28	4.57
1911	332	67‡	114	60	690	105	..	1,034	19.57	54.42	5.83
1912	375	74*	128	76	752	62	.	1,065	18.90	53.80	7.02
1913	380	90‖	146	67	919	167	..	1.264	22 63	62.10	5.30
1914	402	58	126	74	1,027	108	..	1,364	14.43	45.77	5.43
1915	332	83	91	89	1,090	63	..	1,437	25.00	52.41	6.19
1916	353	73†	96	80	1,205	115	..	1,527	20.68	47.87	5 24
1917	371	88	78	106	1,301	96	..	1,650	23.72	44.74	6.42
1918	375	75	95	132	1,347	46	..	1,753	20.00	45.33	7.47
Jan. 1, 1919, to Mar. 31, 1920	574	116	221	132	1,458	111	..	2,025	20.20	58.71	6.51
Apl. 1, 1920, to Mar. 31, 1921	489	88	173	122	1,566	108	..	2,043	14.17	72.60	5.97
Apl. 1, 1921, to Mar. 31, 1922	478	96	178	114	1,649	83	.	2,137	20.08	57.32	5.33

* Three not insane. † One not insane. ‡ Two not insane. ‖ Four not insane.

New Nurses' Home, Public Hospital for Insane, New Westminster.

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TABLE NO. 3A.—SHOWING NUMBER OF ADMISSIONS, DISCHARGES, AND DEATHS FROM APRIL 1ST, 1921, TO MARCH 31ST, 1922, NEW WESTMINSTER.

Months.	Admissions.			Discharges.			Deaths.		
	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.
1921.									
April	27	10	37	2	..	2	1	..	1
May	37	20	57	5	1	6	..	2	2
June	22	14	36	4	1	5	5	1	6
July	18	14	32	2	22	24	4	1	5
August	26	18	44	.	5	5	1	2	3
September	28	14	42	12	10	22	2	6	8
October	19	6	25	11	9	20	1	6	7
November	27	10	37	..	..	..	3	3	6
December	23	19	42	5	14	19	..	3	3
1922.									
January	24	12	36	9	12	21	1	2	3
February	21	12	33	..	4	4	5	5	10
March	36	21	57	8	26	34	3	6	9
Totals	308	170	478	58	104	162	26	37	63

TABLE NO. 3B.—SHOWING NUMBER OF ADMISSIONS, DISCHARGES, AND DEATHS FROM APRIL 1ST, 1921, TO MARCH 31ST, 1922, ESSONDALE.

Months.	Admissions.			Discharges.			Deaths.		
	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.
1921.									
April	27	..	27	2	..	2	4	..	4
May	14	3	17	21	1	22	7	..	7
June	22	1	23	..	..	..	4	..	4
July	4	1	5	2	..	2	2	..	2
August	22	2	24	1	1	2	4	..	4
September	27	1	28	2	..	2	1	..	1
October	16	1	17	31	..	31	2	1	3
November	23	..	23	2	1	3	1	..	1
December	18	..	18	5	..	5	5	..	5
1922.									
January	17	2	19	28	..	28	7	..	7
February	16	..	16	3	..	3	3	..	3
March	26	..	26	10	1	11	8	..	8
Totals	232	11	243	107	4	111	48	1	49

TABLE No. 3c.—SHOWING NUMBER OF ADMISSIONS, DISCHARGES, AND DEATHS FROM APRIL 1ST, 1921, TO MARCH 31ST, 1922, SAANICH.

Months.	Admissions.			Discharges.			Deaths.		
	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.
1921.									
April	..	..	..	2	..	2	..	..	..
May	4	..	4	2	..	2	..	..	..
June	..	..	..	1	..	1	..	..	..
July	..	..	..	..	..	..	1	..	1
August	5	..	5	..	..	..	..	..	..
September	..	..	..	..	..	..	..	..	..
October	4	..	4	..	..	..	..	..	..
November	..	..	..	1	..	1	..	..	..
December	3	..	3	..	..	..	..	..	..
1922.									
January	..	..	..	..	..	..	..	..	..
February	..	..	..	..	..	..	..	..	..
March	4	..	4	2	..	2	1	..	1
Totals	20	..	20	8	..	8	2	..	2

TABLE No. 4.—SHOWING CIVIL STATE OF PATIENTS ADMITTED FROM APRIL 1ST, 1921, TO MARCH 31ST, 1922.

Civil State.	Male.	Female.	Total.
Married	92	94	186
Single	197	66	263
Divorced	1	..	1
Widowed	14	10	24
Unknown	4	..	4
Totals	308	170	478

TABLE No. 5.—SHOWING RELIGIOUS DENOMINATIONS OF PATIENTS ADMITTED FROM APRIL 1ST, 1921, TO MARCH 31ST, 1922.

Religious Denomination.	Male.	Female.	Total.
Atheist	4	1	5
Buddhist	15	..	15
Christian Scientist	3	3	6
Confucian	3	1	4
Greek Catholic	9	3	12
Hebrew	3	1	4
Lutheran	23	5	28
Plymouth Brethren	2	2	4
Protestant	175	131	306
Roman Catholic	65	22	87
Seventh Day Adventist	1	1	2
Unknown	5	..	5
Totals	308	170	478

TABLE No. 6.—SHOWING THE DEGREE OF EDUCATION OF THOSE ADMITTED FROM APRIL 1ST, 1921, TO MARCH 31ST, 1922.

Degree of Education.	Male.	Female.	Total.
Excellent	2	1	3
Good	42	51	93
Common school	194	91	285
Poor	42	11	53
None	28	16	44
Unknown	..	..	..
Totals	308	170	478

TABLE No. 7.—SHOWING THE NATIONALITY OF THOSE ADMITTED FROM APRIL 1ST, 1921, TO MARCH 31ST, 1922.

Nationality.	Male.	Female.	Total.
Alaska	..	1	1
Austria	5	3	8
Bavaria	1	..	1
Belgium	..	1	1
China	12	1	13
Denmark	4	..	4
England	54	49	103
Finland	5	..	5
France	2	2	4
Galicia	1	..	1
Germany	1	1	2
Greece	2	..	2
Holland	2	..	2
India	2	1	3
Ireland	12	3	15
Italy	3	3	6
Jamaica, W.I.	1	1	2
Japan	4	..	4
Newfoundland	2	..	2
New Zealand	1	..	1
Norway	6	1	7
Poland	2	..	2
Russia	9	..	9
Scotland	26	25	51
Serbia	1	..	1
Slavonia	1	..	1
South Africa	..	1	1
Sweden	12	1	13
Switzerland	1	..	1
United States	22	13	35
Wales	4	1	5
Canada—			
Alberta	1	3	4
British Columbia	34	18	52
Manitoba	8	2	10
New Brunswick	8	2	10
Nova Scotia	7	5	12
Ontario	29	25	54
Prince Edward Island	3	4	7
Quebec	16	3	19
Saskatchewan	3	..	3
Canada (general)	1	..	1
Totals	308	170	478

TABLE NO. 8.—SHOWING WHAT DISTRICTS CONTRIBUTED PATIENTS FROM APRIL 1ST, 1921, TO MARCH 31ST, 1922.

Place of Residence at Time of Committal.	Male.	Female.	Total.	Place of Residence at Time of Committal.	Male.	Female.	Total.
				Brought forward	83	25	108
Abbotsford	1	1	2	Lulu Island	1	..	1
Alberta, Province of	1	2	3	Matsqui	1	..	1
Aldergrove	1	1	2	Mayo, Y.T.	..	1	1
Allenby	..	1	1	Michel	1	..	1
Alta Vista	1	..	1	Midway	..	1	1
Anyox	1	..	1	Mission	2	..	2
Armstrong	3	..	3	Murrayville	..	1	1
Atlin	1	..	1	Myrtle Point	1	..	1
B.C. Penitentiary	3	..	3	Nanaimo	3	2	5
Bella Coola	1	..	1	Nelson	1	1	2
Brechin	1	..	1	New Westminster	14	8	22
Burnaby	2	1	3	New Denver	1	..	1
Canim Lake	..	1	1	Nicola	1	..	1
Canoe	1	..	1	North Bend	..	1	1
Chief Lake	1	..	1	Oakalla Prison Farm	5	..	5
Chilliwack	4	1	5	Ocean Falls	1	..	1
Chilcotin	1	..	1	Pemberton Meadows	1	..	1
Clayburn	1	..	1	Penticton	3	..	3
Cloverdale	..	1	1	Pitt Meadows	3	..	3
Cobble Hill	1	..	1	Port Alice	..	1	1
Coombs	1	..	1	Port Coquitlam	2	..	2
Comox	1	..	1	Port Essington	1	..	1
Courtenay	1	1	2	Port Guichon	..	1	1
Cranbrook	2	1	3	Port Hardy	1	..	1
Crawford Bay	..	1	1	Powell River	1	..	1
Crowsnest	1	..	1	Premier	1	..	1
Cumberland	3	2	5	Prince George	..	1	1
Dawson, Y.T.	1	..	1	Prince Rupert	1	1	2
Deroche	1	..	1	Quathiaski Cove	2	..	2
Dorr	1	..	1	Quesnel	2	..	2
Douglas Lake	1	..	1	Revelstoke	4	3	7
Eholt	1	..	1	Richmond	1	..	1
Enirlle	..	1	1	Rivers Inlet	1	..	1
Esquimalt	2	2	4	Saanich	1	2	3
Fairview	..	1	1	Sal spring Island	1	..	1
Fernie	4	..	4	San Jose Bay	1	..	1
Flagstone	1	..	1	Salmon Arm	..	1	1
Fort Fraser	1	..	1	Sapperton	..	1	1
Fort George	2	..	2	Shuswap	1	..	1
Fort Steele	1	..	1	Sicamous	..	1	1
Fraser Mills	..	1	1	Smithers	..	1	1
Frederick Siding	..	1	1	Sperling	1	..	1
Glacier	1	..	1	Stewart	1	..	1
Golden	5	..	5	Sugarcane	..	1	1
Graham Island	1	..	1	Sumas	1	..	1
Granby	1	..	1	Terrace	1	..	1
Grand Forks	3	..	3	Trail	..	1	1
Haney	1	1	2	Ucluelet	..	1	1
Hazelton	3	..	3	Usk	1	..	1
Hollyburn	..	1	1	Vancouver	125	82	207
Hope	1	..	1	" North	6	3	9
Kamloops	11	..	11	" South	4	11	15
Kaslo	1	1	2	" West	2	..	2
Kelowna	..	1	1	Vernon	1	1	2
Ladner	1	..	1	Victoria	19	13	32
Ladysmith	1	..	1	Wellington	1	1	2
Langley Prairie	2	..	2	West Summerland	..	1	1
Lillooet	..	1	1	White Rock	..	2	2
Longworth	1	..	1	Yahk	2	..	2
Carried forward	83	25	108	Totals	308	170	478

TABLE No. 9.—SHOWING THE OCCUPATIONS OF THOSE ADMITTED FROM APRIL 1ST, 1921, TO MARCH 31ST, 1922.

Occupation.	Male.	Female.	Total.
Brought forward	192	114	306
Accountant	1	..	1
Architect	1	..	1
Bank clerk	..	1	1
Barber	2	..	2
Blacksmith	5	..	5
Boiler-maker	2	..	2
Book-keeper	1	1	2
Bottler	1	..	1
Brass-worker	1	..	1
Bridge-builder	1	..	1
Brickmaker	1	..	1
Broker	1	..	1
Builder	1	..	1
Canvasser	1	..	1
Canneryman	1	..	1
Car foreman	1	..	1
Carpenter	6	..	6
Chauffeur	1	..	1
Clergyman	1	..	1
Clerk	7	.	7
Companion	..	2	2
Comptometer	..	1	1
Contractor	4	..	4
Cook	7	..	7
Cooper	1	..	1
Coppersmith	1	..	1
Dressmaker	..	1	1
Engineer	5	..	5
Factory-hand	..	1	1
Farmer	40	..	40
Filer	1	..	1
Fireman	5	..	5
Fisherman	3	..	3
Gardener	2	..	2
Glass-beveller	1	..	1
Governess	..	1	1
Housekeeper	..	21	21
Housewife	..	85	85
Interpreter	1	..	1
Janitor	2	..	2
Labourer	81	..	81
Laundryman	1	..	1
Lineman	1	..	1
Locomotive engineer	1	..	1
Logger	22	..	22
Longshoreman	3	..	3
Machinist	2	..	2
Mechanic	4	..	4
Merchant	1	..	1
Milliner	..	1	1
Miner	14	..	14
Missionary	..	1	1
Moulder	1	..	1
Motorman	1	..	1
Musician	1	1	2
Nightwatchman	1	..	1
None	23	22	45
Nurse	1	5	6
Oiler	1	..	1
Pickler	1	..	1
Plumber	1	..	1
Postman	1	..	1
Powder-maker	1	.	1
Prospector	2	..	2
Railway agent	1	..	1
Rancher	7	..	7
Reporter	1	..	1
Retired	2	..	2
Sailor	4	..	4
Salesman	6	1	7
Seamstress	..	1	1
Secretary	..	2	2
Section foreman	1	..	1
Servant	1	8	9
Stenographer	..	3	3
Student	2	4	6
Tailor	2	..	2
Teacher	1	4	5
Teamster	1	..	1
Telegrapher	1	..	1
Telephone operator	..	1	1
Truck-driver	1	..	1
Typesetter	1	..	1
Unknown	1	..	1
Waiter	1	2	3
Carried forward	192	114	306
Totals	308	170	478

TABLE No. 10.—SHOWING THE AGES OF THOSE ADMITTED FROM APRIL 1ST, 1921, TO MARCH 31ST, 1922.

Age.	Male.	Female.	Total.
Under 15 years	12	11	23
From 15 to 20 years	16	14	30
" 20 " 25 "	30	12	42
" 25 " 30 "	32	17	49
" 30 " 35 "	40	23	63
" 35 " 40 "	45	29	74
" 40 " 45 "	28	17	45
" 45 " 50 "	37	17	54
" 50 " 55 "	20	13	33
" 55 " 60 "	9	2	11
" 60 " 65 "	17	5	22
" 65 " 70 "	5	5	10
" 70 " 75 "	6	3	9
" 75 " 80 "	4	..	4
Over 80 years	5	2	7
Unknown	2	..	2
Totals	308	170	478

TABLE No. 11.—SHOWING THE NUMBER OF ATTACKS IN THOSE ADMITTED FROM APRIL 1ST, 1921, TO MARCH 31ST, 1922.

Number of Attacks.	Male.	Female.	Total.
First	241	114	355
Second	40	37	77
Third	13	12	25
Fourth	3	1	4
Several	7	4	11
Unknown	..	..	..
Not insane	4	2	6
Totals	308	170	478

TABLE No. 12.—SHOWING THE ALLEGED DURATION OF ATTACKS PRIOR TO ADMISSION.

Duration of Attack.	Male.	Female.	Total.
Under 1 week	59	38	97
From 1 week to 1 month	69	32	101
" 1 to 3 months	42	23	65
" 3 " 6 "	30	14	44
" 6 " 12 "	12	4	16
" 1 " 2 years	23	11	34
" 2 " 5 "	19	14	33
" 5 " 10 "	14	14	28
" 10 " 15 "	1	6	7
Over 15 years	15	10	25
Unknown	20	2	22
Not insane	4	2	6
Totals	308	170	478

Table No. 13.—Showing Statistics of Heredity in those admitted from April 1st, 1921, to March 31st, 1922.

Heredity.	Male.	Female.	Total.
Paternal and maternal branches	..	2	2
Paternal branch	4	2	6
Maternal branch	2	7	9
Heredity	27	30	57
Heredity, inferred	82	23	105
Heredity, unknown	189	104	293
Not insane	4	2	6
Totals	308	170	478

Table No. 14.—Showing the Alleged Cause of Attack in those admitted from April 1st, 1921, to March 31st, 1922.

Alleged Cause.	Male.	Female.	Total.
Alcohol	14	1	15
Arteriosclerosis	2	4	6
Congenital	5	..	5
Constitutional	1	3	4
Drugs	19	4	23
Heredity	27	30	57
Heredity, ascertained	6	11	17
Heredity, inferred	82	23	105
Influenza	..	2	2
Lues	15	..	15
Menopause	..	11	11
Nephritis	..	1	1
Not insane	4	2	6
Puberty	..	2	2
Puerperal	..	14	14
Senility	33	6	39
Shock	1	3	4
Syphilis	5	..	5
Traumatic	3	1	4
Unknown	39	15	54
Worry	52	37	89
Totals	308	170	478

Table No. 15.—Showing the State of Bodily Health in those admitted from April 1st, 1921, to March 31st, 1922.

Bodily Condition.	Male.	Female.	Total.
In good health	89	84	173
In average bodily health	59	26	85
In reduced health	160	57	217
In greatly reduced health	..	3	3
Totals	308	170	478

TABLE NO. 16.—SHOWING THE FORM OF MENTAL DISORDER IN THOSE ADMITTED FROM APRIL 1ST, 1921, TO MARCH 31ST, 1922.

Form of Disorder.	Male.	Female.	Total.
Acute mania	1	1	2
Cerebral lues	3	..	3
Dementia præcox	65	33	98
Drug addict	19	4	23
Epileptic	5	3	8
General paresis	20	..	20
Hallucinosis	..	1	1
Hypomania	2	1	3
Idiocy and imbecility	34	23	57
Korsakow's psychosis	1	..	1
Manic depressive	85	55	140
Melancholia	4	5	9
Not insane	4	2	6
Paranoia	17	11	28
Puerperal	..	9	9
Senile dementia	34	14	48
Terminal dementia	1	1	2
Toxic insanity	12	7	19
Traumatic insanity	1	..	1
Totals	308	170	478

TABLE NO. 17A.—SHOWING THE NUMBER ALLOWED OUT ON PROBATION AND RESULTS FROM APRIL 1ST, 1921, TO MARCH 31ST, 1922, NEW WESTMINSTER.

Results.	Male.	Female.	Total.
Discharged recovered	13	31	44
" improved	10	18	28
" unimproved	3	2	5
" not insane	..	1	1
Returned to Hospital	4	23	27
Still out at close of year	17	43	60
Totals	47	118	165

TABLE NO. 17B.—SHOWING THE NUMBER ALLOWED OUT ON PROBATION AND RESULTS FROM APRIL 1ST, 1921, TO MARCH 31ST, 1922, ESSONDALE.

Results.	Male.	Female.	Total.
Discharged recovered	7	..	7
" improved	29	..	29
" unimproved	7	1	8
Returned to Hospital	9	..	9
Still out at close of year	25	1	26
Totals	77	2	79

Table No. 17c.—Showing the Number allowed out on Probation and Results from April 1st, 1921, to March 31st, 1922, Saanich—*Nil.*

Table No. 18a.—Showing the Alleged Duration of Insanity prior to Admission in those discharged from New Westminster from April 1st, 1921, to March 31st, 1922.

Duration of Insanity.	Male.	Female.	Total.
Less than 1 week	18	7	25
Less than 1 month	30	20	50
From 1 to 2 months	11	4	15
" 2 " 3 "	8	3	11
" 3 " 6 "	9	3	12
" 6 " 12 "	2	8	10
" 1 " 2 years	4	4	8
" 2 " 3 "	5	2	7
Over 3 years	13	3	16
Not insane	1	2	3
Unknown	3	2	5
Totals	104	58	162

Table No. 18b.—Showing the Alleged Duration of Insanity prior to Admission in those discharged from Essondale from April 1st, 1921, to March 31st, 1922.

Duration of Insanity.	Male.	Female.	Total.
Less than 1 week	16	..	16
Less than 1 month	31	..	31
From 1 to 2 months	11	..	11
" 2 " 3 "	3	..	3
" 3 " 4 "	4	..	4
" 4 " 5 "	2	..	2
" 5 " 6 "	1	..	1
" 6 " 9 "	3	..	3
" 9 " 12 "	1	..	1
" 1 " 2 years	7	..	7
Over 2 years	8	4	12
Unknown	19	..	19
Not insane	1	..	1
Totals	107	4	111

Table No. 18c.—Showing the Alleged Duration of Insanity prior to Admission in those discharged from Saanich from April 1st, 1921, to March 31st, 1922.

Duration of Insanity.	Male.	Female.	Total.
Less than 1 month	2	..	2
From 2 to 3 months	2	..	2
Over 3 years	1	..	1
Not insane	2	..	2
Unknown	1	..	1
Totals	8	..	8

TABLE NO. 19A.—SHOWING THE LENGTH OF RESIDENCE OF THOSE DISCHARGED FROM NEW WESTMINSTER FROM APRIL 1ST, 1921, TO MARCH 31ST, 1922.

Length of Residence.	Discharged recovered.	Discharged improved.	Discharged unimproved.	Not Insane.
Under 1 month	8	12	3	2
From 1 to 2 months	12	14	1	1
" 2 " 3 "	10	8	3	..
" 3 " 4 "	10	6	..	1
" 4 " 5 "	9	2	..	..
" 5 " 6 "	5	4	1	..
" 6 " 9 "	8	5	1	..
" 9 " 12 "	2	4	2	..
" 1 " 2 years	9	5	2	..
" 2 " 3 "	1	2	..	..
" 3 " 4 "	1	1	..	..
" 4 " 5 "	..	..	1	..
" 5 " 6 "	1	..	..	..
Over 6 years	1	3	1	..
Totals	77	66	15	4

TABLE NO. 19B.—SHOWING THE LENGTH OF RESIDENCE OF THOSE DISCHARGED FROM ESSONDALE FROM APRIL 1ST, 1921, TO MARCH 31ST, 1922.

Length of Residence.	Discharged recovered.	Discharged improved.	Discharged unimproved.	Not Insane.
Under 1 month	2	7	3	..
From 1 to 2 months	3	6	4	..
" 2 " 3 "	1	4	5	1
" 3 " 4 "	3	9	3	..
" 4 " 5 "	2	7	..	..
" 5 " 6 "	2	2	1	..
" 6 " 9 "	3	6	3	..
" 9 " 12 "	2	3	1	..
" 1 " 2 years	..	10	3	..
" 2 " 3 "	..	3	..	..
" 3 " 4 "	..	2	..	..
" 4 " 5 "	..	1	..	..
" 5 " 6 "	..	2	1	..
" 6 " 7 "	..	1	..	..
Over 7 years	1	2	2	..
Totals	19	65	26	1

TABLE NO. 19C.—SHOWING THE LENGTH OF RESIDENCE OF THOSE DISCHARGED FROM SAANICH FROM APRIL 1ST, 1921, TO MARCH 31ST, 1922.

Length of Residence.	Discharged recovered.	Discharged improved.	Discharged unimproved.	Not Insane.
Less than 1 month	..	..	..	..
From 1 to 2 months	..	..	..	..
" 2 " 3 "	..	..	..	..
" 3 " 4 "	..	..	..	1
" 4 " 5 "	..	..	..	..
" 5 " 6 "	..	..	..	1
" 6 " 9 "	..	..	1	..
" 9 " 12 "	..	1	..	..
" 1 " 2 years	..	1	..	..
" 2 " 3 "	..	1	..	..
" 3 " 4 "	..	1	..	..
Over 7 years	..	..	1	..
Totals	..	4	2	2

Table No. 20A.—Record of Deaths from April 1st, 1921, to March 31st, 1922, New Westminster.

Register No.	Initials.	Sex.	Age.	Time in Hospital.			Certified Cause.
				Years.	Months.	Days.	
6310	J. D. McK.	M.	45	..	7	20	Cerebral spinal syphilis.
4475	F. L. P.	F.	50	5	11	5	Acute gastro enteritis.
6788	H. McB.	F.	53	..	3	..	Hypostatic pneumonia.
6627	G. W.	M.	32	..	6	14	Exhaustion of mania.
5844	J. A.	M.	15	2	2	9	Acute pneumonia phthisis.
6793	S. H. L.	M.	15	..	2	21	Exhaustion of mania.
6830	E. J.	F.	24	..	1	24	Acute pneumonia phthisis.
6881	R. C.	M.	40	..	..	28	Cerebral spinal syphilis.
6660	S. S.	M.	52	..	6	13	Exhaustion of senility.
6103	S. C.	M.	74	..	8	12	Hypostatic pneumonia.
6936	A. B.	M.	40	..	..	10	Hypostatic pneumonia.
4008	M. B.	F.	47	7	3	19	Acute pneumonia phthisis.
6564	Y. L. W.	M.	47	1	9	22	Hypostatic pneumonia.
6236	W. M.	M.	60	1	5	30	Exhaustion of senility.
6948	W. S.	M.	35	..	1	2	Exhaustion of general paresis.
5115	V. M. P.	F.	41	4	3	19	Pulmonary tuberculosis.
3460	A. J. B.	F.	22	8	10	3	Exhaustion of idiocy.
6928	E. M.	F.	50	..	2	19	Exhaustion of senility.
751	A. B	F.	62	24	4	21	Pulmonary tuberculosis.
6850	C. M.	F.	54	..	4	10	Exhaustion of senility.
5691	E. F. H.	F.	83	2	10	8	Exhaustion of senility.
6254	E. W.	M.	35	1	7	3	Myocarditis.
6744	W. S.	M.	17	..	7	7	Septicæmia.
5778	R. C.	F.	49	2	7	21	Exhaustion of inanition.
6009	M. B.	F.	74	2	1	25	Exhaustion of senility.
5078	I. H.	F.	76	4	7	13	Dysentery.
5734	A. P.	F.	71	1	9	12	Exhaustion of senility.
3929	A. H.	F.	63	5	11	23	Acute enteritis.
6958	G. D.	M.	30	..	2	17	Exhaustion of acute mania.
4853	M. G.	F.	82	5	3	..	Exhaustion of senility.
7057	H. W.	F.	70	..	..	24	Exhaustion of senility.
5956	L. M.	F.	35	2	..	1	Pulmonary tuberculosis.
7053	F. P.	M.	46	..	1	3	Exhaustion of general paresis.
6341	L. S.	F.	59	1	5	6	Carcinoma.
7059	J. S.	M.	58	..	1	6	Arteriosclerosis-bronchopneumonia.
5591	M. S.	F.	36	3	2	29	Acute enteritis.
6990	R. E. G.	F.	53	..	3	4	Œdema of the brain.
6596	F. N. F.	M.	53	1	1	..	Exhaustion of general paresis.
6900	A. C.	F.	74	..	6	5	Myocarditis.
6799	M. C.	F.	68	..	8	18	Pulmonary tuberculosis.
1588	R. G.	F.	86	15	11	17	Exhaustion of senility.
7125	E. J. R.	F.	64	..	1	..	Myocarditis.
7102	T. C.	M.	77	..	1	15	Bronchopneumonia.
7160	A. P.	F.	44	..	..	18	Acute parenchymatous, nephritis, cystitis, lobar pneumonia.
7192	J. A.	F.	83	..	..	3	Exhaustion of senility and hypostatic pneumonia.
6546	A. F.	F.	82	1	4	21	Lobar pneumonia.
6919	S. S.	M.	72	..	7	22	Exhaustion of senility.
7196	W. B.	M.	35	..	..	10	Exhaustion of acute mania.
7195	J. O.	M.	30	..	..	13	Exhaustion of acute mania.
7114	G. S.	M.	37	..	2	15	Exhaustion of general paresis.
6610	T. N.	F.	32	1	3	14	Lobar pneumonia.
6378	E. A. P.	F.	66	1	9	3	Exhaustion of inanition and hypostatic pneumonia.
5675	J. M. O.	F.	56	3	3	20	Pulmonary tuberculosis.
7205	W. McL.	M.	25	..	..	11	Lobar pneumonia.
7207	N. M. B.	F.	30	..	..	16	Exhaustion of acute mania.
6038	F. G. A.	M.	4	1	6	9	Bronchopneumonia.
7216	T. U. B.	M.	57	..	..	20	Arteriosclerosis and hypostatic pneumonia.
4643	M. J. H.	F.	55	6	2	14	Exhaustion of terminal dementia.
3832	A. P.	F.	40	8	4	29	Pulmonary tuberculosis.
5570	M. S.	F.	66	3	7	17	Exhaustion of senility.
5834	L. W.	F.	23	3	..	7	Pulmonary tuberculosis.
7241	S. C.	F.	81	..	..	20	Myocarditis
7183	R. M. W.	M.	49	..	2	6	Exhaustion of acute mania.

TABLE No. 20B.—RECORD OF DEATHS FROM APRIL 1ST, 1921, TO MARCH 31ST, 1922, ESSONDALE.

Register No.	Initials.	Sex.	Age.	Time in Hospital.			Certified Cause.
				Years.	Months.	Days.	
6421	L. M.	M.	25	..	9	20	Pulmonary tuberculosis.
6473	J. S. A.	M.	85	..	8	9	Myocarditis.
3087	S. L.	M.	38	9	5	28	Tuberculosis, pulmonary and intestinal.
5055	G. W. F.	M.	65	4	1	18	Status epilepticus.
6740	M. F.	M.	Unk.	..	2	21	Pulmonary tuberculosis.
6035	H. N.	M.	35	1	8	12	Exhaustion of general paresis.
4702	T. M.	M.	58	5	2	4	Gastro ulcer, ruptured.
5428	D. L.	M.	67	3	2	16	Exhaustion of senile dementia.
3140	J. R. M.	M.	63	9	4	20	Chronic nephritis.
6692	J. H.	M.	52	..	4	16	Exhaustion of general paresis.
5485	W. S. H.	M.	57	3	1	10	Exhaustion of senile dementia.
6373	C. C. S.	M.	46	1	.	26	Exhaustion of general paresis.
3545	F. G.	M.	64	8	4	15	Pulmonary tuberculosis.
6263	P.P.	M.	38	1	3	21	Pulmonary tuberculosis.
4989	W. M.	M.	55	4	5	29	Lobar pneumonia.
6577	G. R. W.	M.	73	..	9	15	Myocarditis and arteriosclerosis.
6456	T. C.	M.	11	1	..	4	Miliary tuberculosis.
5041	W. B. R.	M.	85	4	5	24	Myocarditis and arteriosclerosis.
6453	C. A. M.	M.	40	1	1	2	Exhaustion of general paresis.
6679	F. H. A.	M.	50	..	7	16	Exhaustion of general paresis.
6781	E. S.]	M.	52	..	5	14	Cerebral hæmorrhage.
6982	C. S.	M.	70	..	1	12	Exhaustion of terminal dementia.
6807	J. G. W.	M.	83	2	9	4	Cerebral hæmorrhage.
2056	W. J. G.	M.	61	13	10	18	Chronic myocarditis and endocarditis.
6253	M. R.	F.	7	1	8	9	Exhaustion and acidosis.
6661	L. P.	M.	40	..	11	..	Exhaustion of general paresis.
7025	J. M.	M.	69	..	2	22	Exhaustion of general paresis.
6291	J. P.	M.	97	1	9	2	Senile exhaustion.
6337	J. C.	M.	52	1	8	10	Exhaustion of paranoia.
7073	T. E. S.	M.	62	..	2	6	Exhaustion of mania.
3796	O. L.	M.	Unk.	8	3	14	Acute gastro enteritis.
7080	D. M.	M.	76	..	1	16	Acute gastro enteritis.
5822	P. H. F.	M.	41	2	9	23	Exhaustion of general paresis.
6622	C. J. T.	M.	61	1	1	26	Cerebral hæmorrhage.
707	C. P.	M.	71	25	5	11	Arteriosclerotic nephritis.
108	T. P.	M.	71	43	9	23	Exhaustion.
6557	A. W.	M.	31	1	3	23	Exhaustion of general paresis.
6908	J. D.	M.	50	..	7	10	Exhaustion of general paresis.
6938	R. H. N. W.	M.	31	..	7	2	Exhaustion of acute mania.
6745	J. F.	M.	50	1	..	2	Exhaustion of general paresis.
5640	C. S.	M.	34	3	4	18	Exhaustion of general paresis.
2414	J. C.	M.	50	12	7	3	Exhaustion of general paresis.
7054	C. M.	M.	43	..	5	..	Pernicious anæmia.
798	— F.	M.	54	24	2	6	Bronchopneumonia.
5587	J. D.	M.	92	3	7	1	Senility and exhaustion.
7107	W. F.	M.	64	..	3	23	Exhaustion of paralysis agitans.
6029	E. F. D.	M.	31	2	7	10	Exhaustion of general paresis.
4947	C. J. L.	M.	50	5	4	25	Exhaustion of senile dementia.
6279	C. O.	M.	47	2	..	18	Exhaustion of general paresis.

TABLE No. 20C.—RECORD OF DEATHS FROM APRIL 1ST, 1921, TO MARCH 31ST, 1922, SAANICH.

Register No.	Initials.	Sex.	Age.	Time in Hospital.			Certified Cause.
				Years.	Months.	Days.	
4982	J. J. M.	M.	55	5	2	27	Cancer of stomach.
4831	L. La F.	M.	33	5	..	13	Tuberculosis of left shoulder and spine.

View from balcony of Nurses' Home, Public Hospital for Insane, New Westminster.

UNIVERSITY OF ILLINOIS LIBRARY

TABLE No. 21.—SHOWING THE NUMBER OF DEPORTATIONS EFFECTED FROM APRIL 1ST, 1921, TO MARCH 31ST, 1922, NEW WESTMINSTER, ESSONDALE, AND SAANICH.

Register No.	Initials.	Sex.	Country of Origin.	Period in Canada prior to Admission to Hospital.			Period in Hospital.		
				Years.	Months.	Days.	Years.	Months.	Days.
6718	S. D.	M.	England	..	7	..	..	4	..
6521	E. M.	M.	U.S.A	..	11	..	..	9	21
6533	L. A. A.	M.	"	..	1	12	1	1	1
5571	C. M. E.	F.	"	.	6	..	3	..	1
6243	F. M. N.	F.	England	..	6	11	1	6	13
3542	M. O'N.	F.	U.S.A.	..	6	10	8	..	..
6848	D. L.	F.	"	1	4	20	..	3	26
6806	A. M. B.	F.	England	1	..	27	..	4	7
6854	A. N. V.	F.	France	..	10	..	..	2	6
4054	L. L.	F.	Ireland	10	..	..	7	10	..
6905	C. I.	F.	U.S.A.	1	10	..	..	8	14
6932	J. M.	M.	Ireland	1	9	..	..	3	2
6929	L. O.	F.	U.S.A.	1	2	..	..	7	12
3915	M. R.	F.	England	4	..	..	7	7	16
6983	E. A. C.	F.	"	5	.	..	..	1	20
6980	Y. K.	M.	Finland	..	7	11	..	3	23
7023	H. P.	M.	England	1	2	..	..	3	25
7019	L. D.	M.	China	..	2	19	..	..	7
7040	H, D.	M.	Scotland	1	4	..	..	1	21
7016	E. W.	M.	Newfoundland	1	6	..	..	6	7
7066	C. S.	M.	U.S.A.	2	1	11	..	2	7
7070	L. Q.	M.	China	2	..	..	..	4	19
6970	A. S.	F.	England	2	..	..	..	7	20
6618	M. G.	F.	Newfoundland	..	..	21	1	3	11
7083	A. S.	M.	Denmark.	1	4	12	..	3	..
7159	R. S.	M.	Scotland	1	..	8	..	2	15
7146	N. Y. W.	F.	England	..	10	8	..	3	..
6720	M. R.	F.	"	2	6	..	1	..	4
2472	D. Z.	M.	Greece	2	..	..	11	8	3
6540	E. W.	M.	Sweden	..	5	..	..	9	25
6312	F. F. D.	M.	Australia	..	10	23	1	3	8
6884	J. C.	M.	Scotland	1	11	..	..	4	25

PART II.—FINANCIAL.

BURSAR'S REPORT.

ESSONDALE, B.C., April 30th, 1922.

H. C. Steeves, B.A., M.D., C.M.,
General Medical Superintendent, Mental Hospitals,
New Westminster, B.C.

SIR,—I beg to submit herewith balance-sheets and Profit and Loss Accounts, together with various other financial and statistical statements, covering the fiscal year of twelve months which closed on March 31st, 1922.

As prophesied in my last year's report to you, the reduction in cost of foodstuffs and various other commodities is reflected in our operating expenses, and I am pleased to draw your attention to a reduction of 12⅔ cents in the daily maintenance cost of each patient, the daily cost now being 80⅔ cents, as compared with 93⅓ cents for last year.

The gross expenditure of all Mental Hospitals totals $558,690.76, as compared to $602,825.98 for the previous year, a reduction of some $44,000.

On the other hand, there has been a falling-off in revenue of some $2,570, due chiefly to the scarcity of employment as well as to dull times generally. The past year has, in fact, proved an exceedingly difficult one in this respect. Never in all my experience have there been so many appeals for consideration on account of inability to meet maintenance charges.

Close attention was given collections, and, working in co-operation with the Inspector of Municipalities, every effort was put forth both to collect for maintenance and protect the patients' estates.

Under the heading of "Maintenance and Repairs, etc.," a substantial reduction was made at all institutions, due in a large measure to the reduction in cost of various materials. In the sum total Essondale appears to have increased about $2,000, but the total of $20,252.26 included the expenditure of $7,113.11 for the installation of a water-supply system necessitated by the breaking of the New Westminster water-mains during the serious flooding of the Coquitlam River, and which amount is included in the *per capita* cost figures shown above, although offset to some extent by the saving made on our regular monthly water-consumption during the winter and spring.

Capital expenditures at New Westminster Institution totalled $21,987.04, as follows:—

Completion of New Nurses' Home	$ 3,953 17
Industrial and Stores Building	15,401 23
New X-ray equipment	2,632 64
	$21,987 04

At Essondale the capital expenditure totalled $25,140.29, as follows:—

Employees' cottages	$ 7,312 91
Grading ground	1,544 29
New laundry machinery	7,627 14
New fire equipment	4,413 45
Preliminary work on new Acute Building	4,242 50
	$25,140 29

All improvements made at Saanich Institution were paid from maintenance vote and charged against operating expenditure under the heading of "Maintenance and Repairs Account," and a comparison shows a reduction this year of $447.32.

The business administration under the Bursar's Department is, I am pleased to report, in splendid shape; accounts and books up to date and properly balanced, with smooth working system operating between ourselves and Provincial Audit Office and Purchasing Agent's Department.

In conclusion, I wish to tender to my assistants in both office and stores my appreciation of their loyal services to the institution and their great assistance to me, and to you, sir, for your co-operation and kindness which have made the duties of the office a pleasure to perform.

All of which is respectfully submitted. I have, etc.,

G. S. MACGOWAN,
Bursar.

PUBLIC HOSPITAL FOR THE INSANE, NEW WESTMINSTER.

BALANCE-SHEET, MARCH 31ST, 1922.

Assets.

Land		$ 80,000 00
Cemetery		610 89
Buildings		497,060 70
Plant and equipment		17,345 82
Furniture and fixtures		17,900 00
Inventories—		
Provisions	$2,456 42	
Furniture and fixtures	4,279 93	
Maintenance and repairs	3,301 58	
Clothing, boots, and slippers	5,366 93	
Miscellaneous	41 55	
		15,446 41
Deficit (cost of operations, 1921–22)		170,677 93
		$799,041 75

Liabilities.

Government of British Columbia	$799,041 75

PROFIT AND LOSS, MARCH 31ST, 1922.

Salaries	$ 85,860 99	
Office supplies	2,366 35	
Travelling expenses	296 18	
Fuel, water, light, and power	26,712 36	
Maintenance and repairs	10,567 17	
Furniture and fixtures	8,565 23	
Provisions	51,464 33	
Clothing, boots, and slippers	2,616 60	
Medical and surgical supplies	2,799 47	
Examinations, committals, and transportation	8,909 28	
Incidentals and unforeseen	10,729 49	
Patient-labour	.....	$ 1,800 00
Collections to Treasury	.....	38,409 52
Net operating cost for year	.....	170,677 93
	$210,887 45	$210,887 45

MENTAL HOSPITAL, ESSONDALE.

BALANCE-SHEET, MARCH 31ST, 1922.

Assets.

Land		$ 111,978 13
Buildings		604,707 95
Furniture and fixtures		36,008 28
Plant and equipment		52,990 59
Inventories—		
Provisions	$2,705 42	
Clothing	5,242 66	
Furniture and fixtures	2,765 17	
Coal	6,849 27	
Maintenance and repairs	5,095 63	
		22,658 15
Deficit (cost of operations, 1921–22)		258,663 44
		$1,087,006 54

Liabilities.

Government of British Columbia	$1,087,006 54

PROFIT AND LOSS, MARCH 31ST, 1922.

Salaries	$115,377 91	
Office supplies	2,936 02	
Travelling expenses	950 70	
Fuel, light, water, and power	36,349 87	
Maintenance and repairs	20,252 26	
Furniture and fixtures	12,203 99	
Provisions	96,038 30	
Clothing and boots	26,908 88	
Medical and surgical supplies	3,112 77	
Examintions, committals, and transportation	326 95	
Incidentals and unforeseen	6,692 70	
Patient-labour	.....	$ 19,408 00
Collections to Treasury	.....	43,078 91
Net operating cost for year	.....	258,663 44
	$321,150 35	$321,150 35

MENTAL HOME, SAANICH.

Balance-sheet, March 31st, 1922.

Assets.

Land		$ 12,100 00
Buildings		229,705 00
Furniture and fixtures		14,048 49
Implements and live stock		3,877 40
Airing and recreation court		750 00
Inventories—		
Groceries	$483 82	
Clothing	694 40	
Fuel	90 00	
Miscellaneous	558 98	
		1,827 20
Deficit (cost of operations, 1921–22)		43,597 31
		$305,905 40

Liabilities.

Government of British Columbia	$305,905 40

Profit and Loss, March 31st, 1922.

Salaries	$ 16,608 43	
Office supplies	356 43	
Travelling expenses	88 09	
Fuel, water, light, and power	6,634 95	
Maintenance and repairs	2,842 77	
Furniture and fixtures	688 81	
Provisions	12,383 94	
Clothing	3,807 19	
Medical and surgical	483 98	
Examinations, committals, and transportation	284 55	
Incidentals	3,681 82	
Collections to Treasury		$ 4,263 65
Net cost of operations		43,597 31
	$ 47,860 96	$ 47,860 96

FINANCIAL TABLES.

TABLE A.—SHOWING THE AVERAGE NUMBER OF PATIENTS IN RESIDENCE EACH YEAR, THE TOTAL AMOUNTS SPENT FOR MAINTENANCE, AND THE GROSS PER CAPITA COST.

Year.	Average Number in Residence.	Maintenance Expenditure.	*Per Capita* Cost.
1872 (81 days)	16.57	$ 2,265 25	$616 00
1873	16.07	7,841 94	487 98
1874	16.76	8,232 41	491 20
1875	27.42	9,892 38	360 77
1876	36.41	12,558 18	344 91
1877	34.61	12,917 17	373 26
1878	36.52	13,985 05	382 93
1879	38.17	10,253 72	268 63
1880	45.42	10,552 18	232 32
1881	47.18	10,691 76	226 62
1882	47.86	11,343 65	237 02
1883	48.73	11,829 11	242 75
1884	48.70	11,843 94	243 20
1885	54.67	15,555 87	284 54
1886	59.11	15,334 43	259 42
1887	73.55	15,945 22	216 70
1888	79.43	16,261 06	204 72
1889	71.30	15,657 79	219 60
1890	78.78	17,577 80	223 13
1891	119.87	21,757 03	181 50
1892	125.24	23,518 37	187 80
1893	133 92	25,904 98	193 36
1894	148.64	26,495 83	178 25
1895	162.97	31,587 89	193 83
1896	171.43	32,001 40	186 67
1897	188.91	36,224 76	191 75
1898	216.53	46,420 25	214 38
1899	226.44	54,917 45	242 52
1900	243.24	59,349 20	244 00
1901	269.56	55,406 08	205 54
1902	296.62	55,345 65	186 59
1903	332.23	59,353 57	178 65
1904	351.55	66,052 76	187 89
1905	340.90	63,342 07	185 80
1906	374.57	66,596 69	177 79
1907	419.24	74,874 64	178 59
1908	490.80	90,269 49	183 92
1909	526.85	96,586 32	183 32
1910	563.33	103,900 44	184 43
1911	641.02	126,782 50	197 78
1912	736.72	130,924 06	177 71
1913, M.H., New Westminster	550.54	119,663 71	217 36
1913, M.H., Essondale (9 months)	384.07	71,079 84	184 76
1914, M.H., New Westminster	487.24	125,981 45	258 56
1914, M.H., Essondale	489.07	131,420 44	268 36
1915, M.H., New Westminster	515.74	123,021 70	238 53
1915, M.H., Essondale	560.56	123,878 43	220 99
1916, M.H., NewWestminster	524.17	116,052 21	221 40
1916, M.H., Essondale	633.13	155,698 37	245 91
1917, M.H., New Westminster	535.66	124,124 68	231 72
1917, M.H., Essondale	716.35	166,231 51	232 05
1918, M.H., New Westminster	585 38	156,574 85	267 47
1918, M.H., Essondale	752.78	222,097 37	295 03
1919-20, M.H., New Westminster (15 months)	562.12	236,631 90	420 97
1919-20, M.H., Essondale (15 months)	755.46	357,630 99	473 38
1919-20, M.H., Saanich (373 days)	90.51	40,433 28	446 72
1920-21, M.H., New Westminster	567.47	233,486 76	411 44
1920-21, M.H., Essondale	834.10	336,585 35	403 52
1920-21, M.H., Saanich	108.67	51,995 87	478 47
1921-22, M.H., New Westminster	596.07	210,887 45	353 79
1921-22, M.H., Essondale	890.32	321,150 35	360 71
1921-22, M.H., Saanich	120.05	47,860 96	398 67

TABLE B.—SHOWING ANALYSIS OF THE PER CAPITA COST.

Year.	Salaries.	Provisions.	Clothing.	Fuel and Light.	Furniture.	Medicines.	Miscellaneous.	Total.
1872.....	$279 38	$184 03	$55 81	$22 44	$15 55	$10 18	$49 30	$616 69
1873.....	221 48	166 81	14 55	23 65	21 59	7 74	32 16	487 98
1874.....	231 10	152 10	22 07	23 98	28 36	7 78	25 81	491 20
1875.....	153 82	113 40	13 98	16 88	25 45	6 73	30 51	360 77
1876.....	143 34	114 45	18 68	22 75	17 90	2 86	24 93	344 91
1877.....	177 15	126 75	20 69	4 66	20 75	3 74	19 52	373 26
1878.....	176 16	124 23	30 43	13 94	7 20	9 16	21 82	382 93
1879.....	134 27	95 10	3 25	15 91	6 39	6 31	7 40	268 63
1880.....	111 84	87 71	5 74	14 06	6 00	3 63	3 34	332 32
1881.....	112 44	81 14	6 86	12 73	5 55	2 56	5 34	226 62
1882.....	121 51	84 52	7 05	12 30	4 54	3 49	3 61	237 02
1883.....	123 81	92 56	6 03	11 04	4 26	2 24	2 82	242 75
1884.....	124 02	90 64	7 03	12 43	4 14	2 77	2 18	243 20
1885.....	169 05	84 33	6 33	15 05	3 90	2 93	2 95	284 54
1886.....	159 03	69 35	5 49	16 20	3 72	1 59	4 04	259 42
1887.....	127 80	59 10	5 88	15 38	3 88	93	3 81	216 78
1888.....	118 34	60 47	4 41	13 90	3 11	2 09	2 40	204 72
1889.....	131 70	59 11	7 20	12 93	4 13	2 07	2 46	219 60
1890.....	121 54	62 77	9 02	17 31	4 00	1 29	7 19	223 12
1891.....	88 35	54 79	3 83	20 43	3 40	1 89	8 81	181 50
1892.....	94 25	56 74	4 69	20 53	3 35	1 80	6 42	187 80
1893.....	95 50	53 55	5 43	22 60	3 39	2 69	10 20	193 36
1894.....	87 76	57 07	5 25	18 83	2 98	1 43	4 93	178 25
1895.....	90 83	61 15	9 90	20 41	2 51	3 10	5 93	193 83
1896.....	89 13	55 93	6 30	20 29	2 56	3 63	8 83	186 67
1897.....	89 09	58 18	8 36	19 11	2 95	3 86	10 20	191 75
1898.....	94 68	69 43	9 94	21 82	2 76	5 12	10 62	214 37
1899.....	113 31	72 91	8 31	33 96	2 50	2 73	8 80	242 52
1900.....	116 04	72 62	9 06	32 10	2 15	1 71	10 32	244 00
1901.....	99 16	66 65	10 12	18 52	3 25	1 07	6 77	205 54
1902.....	87 47	61 13	7 95	15 25	4 13	1 20	9 46	186 59
1903.....	82 36	57 86	8 58	14 77	3 24	1 91	9 93	178 65
1904.....	87 43	60 01	6 85	17 84	4 48	2 10	9 18	187 89
1905.....	92 17	54 09	5 99	17 93	3 83	2 03	9 76	185 80
1906.....	88 76	53 15	5 16	15 92	3 57	1 21	10 02	177 79
1907.....	89 18	48 47	5 81	19 82	3 02	1 57	10 72	178 59
1908.....	90 93	49 17	6 61	17 63	4 56	1 79	13 23	183 92
1909.....	94 27	53 41	8 16	13 02	2 78	84	10 84	183 32
1910.....	95 97	48 43	7 87	21 32	2 02	1 15	7 67	184 43
1911.....	97 44	58 08	9 39	18 84	1 12	1 87	11 04	197 78
1912.....	78 40	56 37	10 09	19 36	1 79	1 50	10 20	177 71
1913, M.H., New West.	102 37	54 07	9 43	25 27	4 74	3 21	18 27	217 36
1913, M.H., Essondale.	93 56	49 90	5 50	25 13	55	1 02	14 10	184 76
1914, M.H., New West.	115 72	68 15	2 99	24 13	69	2 64	44 24	258 56
1914, M.H., Essondale.	113 06	81 42	15 49	28 93	4 14	1 19	24 13	268 36
1915, M.H., New West.	110 94	64 32	7 57	20 30	....	1 88	33 52	238 53
1915, M.H., Essondale.	95 25	62 84	9 44	24 87	1 14	56	26 89	220 99
1916, M.H., New West.	105 89	74 96	2 58	18 52	....	1 45	18 00	221 40
1916, M.H., Essondale.	89 26	75 18	17 76	26 96	4 98	42	31 35	245 91
1917, M.H., New West.	103 41	72 20	10 52	18 29	....	2 38	24 92	231 72
1917, M.H., Essondale.	83 57	79 98	18 92	23 39	4 77	81	20 61	232 05

This accounting system discontinued in 1917, and new system installed as per Table B 1.

TABLE B 1.—SHOWING ANALYSIS OF THE GROSS PER CAPITA COST.

Year.	Salaries.	Office Supplies.	Travelling Expenses.	Fuel, Water, Light.	Repairs and Renewals.	Furniture and Fixtures, Bedding, etc.	Provisions.	Clothing, Boots, and Slippers.	Medical and Surgical Supplies.	Examination, Committal, and Transportation.	Incidentals and Unforeseen.	Total Gross.
1918, New Westminster	$102.815	$2.133	$0.097	$27.186	$3.706	$9 547	$ 99.989	$ 7.103	$2.102	$4.103	$8.694	$267.47
1918, Essondale.....	96.777	3.000	0.482	33.378	5.849	8.438	118.888	17.235	1.663	0.060	9.266	295.03
1919-20, New Westminster (15 months)..	168.789	4.375	0.581	45.794	19.216	10.052	133.599	5.467	5.061	14.230	13 806	420.970
1919-20, Essondale (15 months)	155.850	3.812	1.218	47.000	31.584	12.414	176.575	27.488	2.118	1.466	13.856	473.381
1919-20, Saanich (373 days).....	160.550	4.954	3.372	41.927	15.894	10.336	140.601	26.270	1.931	6.183	34.708	446.726
1920-21, New Westminster	150.462	3.535	0.513	39.685	20.993	18.365	122.845	17.038	6.392	13.549	18.069	411.446
1920-21, Essondale	132.321	3.754	1.399	35.996	21.890	13.587	147.415	35.304	3.037	0.279	8.542	403.524
1920-21, Saanich.....	153.924	2.070	1.783	54.736	30.275	6.654	131.475	31.359	5.173	0.140	61.481	479.470
1921-22, New Westminster	144.045	3.970	0.497	44.814	17.728	14.369	86.339	4.389	4.696	14.946	18.000	353.793
1921-22, Essondale.....	129.591	3.297	1.067	40.826	22.747	13.707	107.869	30.224	3.496	0.367	7.517	360.708
1921-22, Saanich.....	138.346	2.969	0.733	55.268	23.679	5.737	103.156	31.713	4.031	2.370	30.669	398.671

Table C.—Showing the Total Expenditure of the Mental Hospital annually since its Inception, analysed under its Various Headings.

Year.	Salaries.	Provisions.	Clothing.	Fuel and Light.	Furniture (estimat'd)	Medicines, etc.	Miscellaneous.	Total of Current Expenditure.	Expenditure on Capital Account.			
									New Furniture.	Library.	Surgical Instruments.	Lands and Works.
1872-87	$91,899 70	$59,567 24	$6,482 84	$9,317 03	$5,331 52	$2,307 04	$6,131 55	$181,042 26	$2,600 00	.....	.....	$917 26
1888	9,399 96	4,803 57	350 17	1,103 86	247 24	165 60	190 66	16,261 06	.....	.....	$ 32 00	224 34
1889	9,390 62	4,214 19	513 73	922 00	293 69	147 76	175 80	15,657 79	.....	.....	.....	625 56
1890	9,575 13	4,945 57	710 64	1,363 52	315 28	101 90	565 96	17,577 80	2,800 00	.....	.....	2,181 91
1891	10,590 28	6,568 27	459 58	2,449 09	406 84	226 31	1,056 66	21,757 03	900 00	.....	.....	1,001 86
1892	11,803 83	7,106 64	587 48	2,571 26	418 82	226 19	804 15	23,518 37	.....	.....	.....	433 99
1893	12,790 28	7,172 53	729 38	3,029 00	452 55	362 08	1,369 16	25,904 98	650 00	$ 19 00	10 75	718 49
1894	13,044 16	8,492 53	771 05	2,799 87	442 69	212 86	732 67	26,495 83	200 00	.....	.....	170 32
1895	14,802 47	9,963 54	1,611 96	3,324 54	419 01	502 90	963 47	31,587 89	1,800 00	.....	.....	1,915 28
1896	15,280 62	9,588 22	1,079 85	3,479 46	439 36	623 24	1,511 05	32,001 40	800 00	.....	148 01	1,126 74
1897	16,829 76	10,991 05	1,579 08	3,610 03	557 97	728 73	1,928 14	36,224 76	1,200 00	5 15	19 00	848 38
1898	20,502 31	15,032 71	2,153 11	4,725 96	598 05	1,109 66	2,298 45	46,420 25	2,700 00	.....	6 39	5,320 30
1899	25,658 15	16,511 05	1,882 13	7,690 35	566 86	617 27	1,991 64	54,917 45	1,300 00	8 60	.....	2,518 80
1900	28,224 96	17,665 60	2,203 97	7,807 15	521 96	415 10	2,510 46	59,349 20	2,400 00	29 10	11 89	1,806 10
1901	26,729 01	17,967 31	2,727 11	4,993 67	875 30	288 40	1,823 28	55,406 08	1,840 53	25 10	14 65	5,175 20
1902	25,945 89	18,132 13	2,359 90	4,525 45	1,221 87	354 38	2,806 03	55,345 65	1,157 47	104 20	19 20	5,561 42
1903	27,362 37	19,222 50	2,850 19	4,906 22	1,077 73	634 16	3,300 40	59.353 57	1,723 70	111 48	9 00	8,426 70
1904	30,735 95	21,096 19	2,409 34	6,271 55	1,574 84	738 85	3,226 04	66,052 76	1,463 48	132 53	16 95	4,593 88
1905	31,421 45	18,437 99	2,043 45	6,110 76	1,306 22	693 49	3,328 71	63,342 07	1,711 84	91 47	69 15	3,981 72
1906	33,243 80	19,908 19	1,934 15	5,965 32	1,337 80	453 41	3,754 02	66,596 69	1,365 76	100 30	114 16	5,564 03
1907	37,394 21	20,326 99	2,439 64	8,314 36	1,265 63	655 66	4,498 15	74,874 64	4,352 22	150 88	144 63	9,410 66
1908	44,626 20	24,132 49	3,244 77	8,652 81	2,239 68	877 40	6,496 14	90,269 49	5,646 86	127 50	91 01	10,775 00
1909	49,665 85	28,142 65	4,298 91	6,856 11	1,465 79	441 59	5,715 42	96.586 32	2,598 95	89 58	21 30	16,615 10
1910	54,049 80	27,278 49	4,437 29	12,014 30	1,141 57	653 09	4,325 90	103,900 44	4,043 58	139 76	9 50	12,465 08
1911	62,453 00	37,229 56	6,020 57	12,079 62	722 10	1,200 92	7,076 73	126,782 50	11,169 78	154 75	43 82	14,429 02
1912	57,755 68	41,531 72	7,433 68	14,266 18	1,318 66	1,105 82	7,512 32	130,924 06	4,477 21	187 46	301 15	13,144 06
1913, New Westminster.	56,359 76	29,767 27	5,191 33	13,909 72	2,608 03	1,767 42	10,060 18	119,663 71	4,697 77	131 93	69 13	17,701 00
1913, Essondale. (9 mos.)	35,993 98	17,271 35	2,117 73	9,669 99	208 76	395 80	5,422 23	71,079 84	46,680 54	212 79	.....	14,904 63
1914, New Westminster.	56,381 62	33,204 11	1,455 28	11,758 11	338 03	1,286 68	21,557 62	125,981 45	.....	4,417 50	.....	10,117 16
1914, Essondale	55,364 40	39,873 66	7,585 71	14,168 66	2,026 29	584 23	11,817 49	131,420 44	1,087 31	.....	.....	4,236 37
1915, Essondale	53,392 50	35,225 51	5,287 03	13,942 39	639 67	316 87	15,074 46	123,878 43	841 31	.....	.....	4,628 99
1915, New Westminster.	57,217 21	33,174 90	3,902 49	10,469 03	.....	969 58	17,288 49	123,021 70	1,044 11	.....	.....	5,910 38
1916, New Westminster.	55,501 35	39,294 07	1,349 48	9,696 04	.....	777 94	9,433 33	116,052 21	1,395 09	.....	.....	8,623 88
1916, Essondale	56,515 64	47,601 27	11,242 29	17,066 96	3,154 13	268 96	19,849 12	155,698 37	2,418 80	.....	.....	14,402 82
1917, New Westminster.	55,393 19	38,674 92	5,639 40	9,795 36	.....	1,275 54	13,346 27	124,124 68	1,538 13	.....	.....	3,455 96
1917, Essondale	59,862 30	57,294 25	13,555 03	16,759 02	3,415 42	578 58	14,766 91	166,231 51	1,611 63	.....	.....	10,515 80

Above system discontinued in 1917. *See* new Table C 1, below.

TABLE C 1.—SHOWING GROSS EXPENDITURE IN PROFIT AND LOSS ACCOUNTS FOR YEAR ANALYSED UNDER ITS VARIOUS HEADINGS.

Year.	Salaries.	Office Supplies and Postage.	Travelling Expenses.	Fuel, Water, Light, and Power.	Repairs and Renewals.	Furniture and Fixtures, Bedding, etc.	Provisions.	Clothing, Boots, and Slippers.	Medical and Surgical Supplies.	Examination, Committal, and Transportation.	Incidentals and Unforeseen.	Total Gross.
1918, New Westminster	$60,185 88	$1,248 42	$ 57 32	$15,913 89	$2,169 74	$5,588 44	$58,531 74	$ 4,157 86	$1,230 61	$2,401 62	$5,089 33	$156,574 85
1918, Essondale..	72,853 08	2,258 13	363 14	25,126 54	4,403 10	6,351 27	89,496 23	12,974 41	1,252 08	44 75	6,975 64	222,097 37
1919-20, New Westminster (15 months) ..	94,878 17	2,459 16	326 40	25,741 44	10,801 50	5,650 38	75,097 52	3,073 27	2,844 64	7,998 75	7,760 67	236,631 90
1919-20, Essondale (15 months)	117,738 67	2,879 47	920 30	35,512 26	23,860 37	9,380 10	133,595 18	20,766 40	1,601 14	1,107 67	10,469 43	357,630 99
1919-20, Saanich (373 days).....	14,531 52	448 35	305 12	3,794 84	1,438 56	935 58	12,725 70	2,377 75	174 86	559 65	3,141 35	40,433 28
1920-21, New Westminster	85,383 61	2,006 14	291 39	22,520 67	11,912 85	10,421 97	69,711 30	9,668 82	3,627 47	7,689 08	10,253 46	233,486 76
1920-21, Essondale	111,370 33	3,131 52	1,167 54	30,025 06	18,258 58	11,332 97	122,960 16	29,447 19	2,533 64	232 90	7,125 46	336,585 35
1920-21, Saanich.....	16,726 99	224 99	193 75	5,948 25	3,290 09	657 94	14,287 41	3,407 80	562 19	15 30	6,681 16	51,995 87
1921-22, New Westminster	85,860 99	2,366 35	296 18	26,712 36	10,567 17	8,565 23	51,464 33	2,616 60	2,799 47	8,909 28	10,729 49	210,887 45
1921-22, Essondale.....	115,377 91	2,936 02	950 70	36,349 87	20,252 26	12,203 99	96,038 30	26,908 88	3,112 77	326 95	6,692 70	321,150 35
1921-22, Saanich.	16,608 43	356 43	88 09	6,634 95	2,842 77	688 81	12,383 94	3,807 19	483 98	284 55	3,681 82	47,860 96

TABLE D.—SUMMARY STATEMENT SHOWING THE GROSS AND NET PER CAPITA COST OF INSANE PATIENTS IN THE THREE INSTITUTIONS.

Public Hospital for Insane, New Westminster—			
Total maintenance vouchers		$212,386 09	
Colony Farm Produce Account		18,135 28	
Mental Hospital, Essondale Account		75 00	
March 31, 1921. Inventory, maintenance and repairs		195 17	
" " " furniture and fixtures		3,015 20	
" " " provisions		3,679 11	
" " " clothing		4,924 86	
" " " miscellaneous		235 23	
		$242,645 94	
Less Tailor Account for Essondale	$12,701 50		
" Tailor Account for Saanich	2,060 50		
" Hogman's salary, Colony Farm	660 00		
" plants, etc., for Essondale	504 30		
" provisions for Essondale	107 09		
" supplies for Colony Farm	129 69		
" Shoemaker Account for Essondale	149 00		
" patient-labour, Colony Farm	1,800 00		
" March 31, 1922. Inventory, maintenance and repairs	3,301 58		
" " " " furniture and fixtures	4,279 93		
" " " " provisions	2,456 42		
" " " " clothing	5,366 93		
" " " " incidentals and unforeseen	41 55		
		33,558 49	
Total, Public Hospital for Insane, New Westminster			$209,087 45
Provincial Mental Hospital, Essondale—			
Total maintenance vouchers		$286,988 72	
Colony Farm Produce Account		40,998 98	
Colony Farm, miscellaneous		1,313 42	
New Westminster Hospital, Tailor Account		12,701 50	
" " Shoemaker Account		149 00	
" " miscellaneous		611 39	
March 31, 1921. Inventory, fuel, water, light, and power		795 20	
" " " maintenance and repairs		983 77	
" " " furniture and fixtures		3,360 83	
" " " provisions		2,335 50	
" " " clothing		6,798 55	
		$357,036 86	
Less supplies to New Westminster	$ 75 00		
" supplies to S.C.R. Department	15 00		
" coal to Colony Farm	2,867 74		
" board to farm employees	9,960 00		
" sundry supplies to Colony Farm	310 62		
" patient-labour	19,408 00		
" March 31, 1922. Inventory, fuel	6,849 27		
Carried forward	$39,485 63	$357,036 86	$209,087 45

TABLE D.—SUMMARY STATEMENT SHOWING THE GROSS AND NET PER CAPITA COST OF INSANE PATIENTS IN THE THREE INSTITUTIONS—*Continued.*

Brought forward	$39,485 63	$357,036 86	$209,087 45
Provincial Mental Hospital, Essondale—*Continued.*			
Less March 31, 1922. Inventory, maintenance and repairs	5,095 63		
" " " " furniture and fixtures	2,765 17		
" " " " provisions	2,705 42		
" " " " clothing	5,242 66		
		55,294 51	
Total, Provincial Mental Hospital, Essondale			301,742 35
Mental Home, Saanich—			
Total maintenance vouchers		$ 47,912 89	
New Westminster Institution, Tailor Account		2,060 50	
Colony Farm, live stock, etc.		1,122 25	
March 31, 1921. Inventory, furniture and fixtures		106 67	
" " " provisions		305 81	
" " " clothing, etc.		596 14	
" " " medical and surgical		25 00	
		$ 52,129 26	
Less March 31, 1922. Inventory, fuel	$ 90 00		
" " " " provisions	483 82		
" " " " clothing	694 40		
" " " " miscellaneous	558 98		
" live stock, etc., transferred to Asset Account	2,441 10		
		4,268 30	
Total Mental Home, Saanich			47,860 96
Total operating expense for the three institutions, New Westminster, Essondale, and Saanich			$558,690 76
Less collections remitted to Treasury—			
Public Hospital for the Insane, New Westminster		$38,409 52	
Provincial Mental Hospital, Essondale		43,078 91	
Mental Home, Saanich		4,263 65	
			85,752 08
Total net expense for the three institutions			$472,938 68

Total average population for the three institutions, 1,606.45, showing a net *per capita* cost at the rate of $294.40 per year, or 80⅔ cents per day.

TABLE E.—EXPENSE AND REVENUE STATEMENT OF THE NEW WESTMINSTER HOSPITAL FOR 12 MONTHS ENDING MARCH 31ST, 1922.

Operating Expense Accounts.

Operating expenditure by voucher—		
Salaries—		
Medical and clerical staff	$11,918 97	
Other employees	78,202 02	
		$ 90,120 99
Carried forward		$ 90,120 99

TABLE E.—EXPENSE AND REVENUE STATEMENT OF THE NEW WESTMINSTER HOSPITAL FOR 12 MONTHS ENDING MARCH 31ST, 1922—*Continued.*

Operating Expense Accounts—Continued.

Brought forward		$ 90,120 99
Operating expenditure by voucher—*Continued.*		
Office supplies, etc.—		
Books and journals	$ 433 85	
Postage and office supplies	1,289 99	
Telephone and telegrams	642 51	
		2,366 35
Travelling expenses		296 18
Fuel, water, light, and power—		
Fuel	$21,389 95	
Water	2,383 52	
Light and power	2,938 89	
		26,712 36
Maintenance and repairs—		
Repairs and renewals	$13,119 07	
Janitors' supplies	983 81	
		14,102 88
Furniture and fixtures—		
Bedding	$ 4,635 12	
Furniture and fixtures	3,897 46	
Miscellaneous	1,297 38	
		9,829 96
Provisions—		
Groceries and flour	$25,944 22	
Meats	7,209 32	
Fish	2,836 75	
		35,990 29
Uniforms and clothing—		
Clothing	$12,447 25	
Boots and slippers	1,922 42	
		14,369 67
Medical and surgical supplies—		
Medicines and drugs	$ 2,316 37	
Surgical instruments	483 10	
		2,799 47
Examinations, committals, and transportation—		
Examinations	$ 839 00	
Committals	40 00	
Transportation	8,030 28	
		8,909 28
Incidentals and unforeseen—		
Amusements	$ 438 00	
Gratuities	354 20	
Funerals	475 00	
Auto-tires	292 29	
Auto-repairs	554 58	
Gasolene and oils	1,053 08	
Tools and implements	759 66	
Freight and cartage	41 72	
Miscellaneous	2,920 13	
		6,888 66
Total expenditure per year by voucher		$212,386 09
Carried forward		$212,386 09

TABLE E.—EXPENSE AND REVENUE STATEMENT OF THE NEW WESTMINSTER HOSPITAL FOR 12 MONTHS ENDING MARCH 31ST, 1922—*Continued.*

Operating Expense Accounts—Continued.

Brought forward		$212,386 09
Institution Trading Accounts—		
From Colony Farm—		
Dairy supplies	$ 8,449 17	
Meats	1,987 09	
Fruits, vegetables, etc.	3,945 12	
Incidentals	3,753 90	
		18,135 28
From Mental Hospital, Essondale, sundry supplies		75 00
		$230,596 37

Summary of Profit and Loss Accounts.		Yearly *Per Capita* Cost.
Salaries	$ 85,860 99	$144.045
Expenses—		
Office supplies, etc.	2,366 35	3.970
Travelling expenses	296 18	.497
Fuel, light, water, and power	26,712 36	44.814
Maintenance and repairs	10,567 17	17.728
Furniture and fixtures	8,565 23	14.369
Provisions	51,464 33	86.339
Clothing, boots, and slippers	2,616 60	4.389
Medical and surgical supplies	2,799 47	4.696
Examinations, committals, and transportation	8,909 28	14.946
Incidentals and unforeseen	10,729 49	18.000
Total gross expenditure	$210,887 45	$353.793
Less patient-labour (against market price for farm produce)	1,800 00	3.019
	$209,087 45	$350.774
Less Revenue Account (maintenance of patients)	38,409 52	64.438
Net cost of patients' maintenance to Government	$170,677 93	$286.336

Remarks.

Total patients in residence, New Westminster, March 31st, 1922	599
Daily average population, New Westminster, for year	596.07
Gross maintenance *per capita* cost, 1 year	$353.79
„ „ „ 1 day	.969
Net maintenance *per capita* cost, 1 year	286.33
„ „ „ 1 day	.784

Capital Expenditure.

Nurses' Home (balance)	$ 3,953 17
Industrial and Store Building	15,401 23
X-ray equipment	2,632 64
	$21,987 04

TABLE F.—EXPENSE AND REVENUE STATEMENT OF THE ESSONDALE HOSPITAL FOR 12 MONTHS ENDING MARCH 31ST, 1922.

Operating Expense Accounts.

Operating expenditure by voucher—		
Salaries—		
Medical and clerical staff	$14,453 28	
Other employees	100,924 63	
		$115,377 91
Office supplies—		
Books and journals, etc.	$ 78 38	
Postage and office supplies	1,742 75	
Telegrams and telephone	1,114 89	
		2,936 02
Travelling expenses		950 70
Fuel, water, light, and power—		
Fuel	$39,158 98	
Water	2,994 84	
Light and power	2,772 86	
		44,926 68
Maintenance and repairs—		
Repairs and renewals	$14,194 79	
Janitors' supplies	2,429 50	
New water system	7,113 11	
		23,737 40
Furniture and fixtures—		
Bedding	$ 3,931 12	
Furniture and fixtures	5,788 26	
Miscellaneous	1,888 95	
		11,608 33
Provisions—		
Groceries and flour	$47,752 54	
Meats	13,355 33	
Fish	3,964 90	
		65,072 77
Uniforms and clothing—		
Clothing	$ 8,898 45	
Boots and slippers	3,744 04	
		12,642 49
Medical and surgical supplies—		
Medicine and drugs	$ 2,146 98	
Surgical instruments	965 79	
		3,112 77
Examinations, committals, and transportation—		
Examination	$ 5 00	
Transportation	321 95	
		326 95
Incidentals and unforeseen—		
Amusements	$ 761 00	
Gratuities	625 73	
Funerals	780 00	
Auto-tires	276 65	
Auto-repairs	278 95	
Carried forward	$ 2,722 33	$280,692 02

TABLE F.—EXPENSE AND REVENUE STATEMENT OF THE ESSONDALE HOSPITAL FOR 12 MONTHS ENDING MARCH 31ST, 1922—*Continued.*

Operating Expense Accounts—Continued.

Brought forward	$ 2,722 33	$280,692 02
Operating expenditure by voucher—*Continued.*		
Incidentals and unforeseen—*Continued.*		
Gasolene and oils	908 72	
Tools and implements	296 14	
Freight and cartage	57 52	
Miscellaneous	2,311 99	
		6,296 70
Total expenditure for year by voucher		$286,988 72
Institution Trading Accounts—		
Colony Farm supplies—		
Dairy produce	$19,725 62	
Meats	5,634 24	
Eggs and poultry	3,083 46	
Fruit, vegetables, etc.	11,323 09	
Horse-labour, etc.	1,232 57	
Miscellaneous	1,313 42	
		42,312 40
Public Hospital for Insane—		
Attendants' uniforms	$ 7,470 00	
Patients' clothing	5,231 50	
Boots	149 00	
Miscellaneous	611 39	
		13,461 89
		$342,763 01

Summary of Profit and Loss Accounts.		Yearly *Per Capita* Cost.
Salaries	$115,377 91	$129.591
Expenses—		
Office supplies	2,936 02	3.297
Fuel, water, light, and power	36,349 87	40.826
Travelling expenses	950 70	1.067
Maintenance and repairs	20,252 26	22.747
Furniture and fixtures	12,203 99	13.707
Provisions	96,038 30	107.869
Clothing	26,908 88	30.224
Medical and surgical supplies	3,112 77	3.496
Examinations, committals, and transportation	326 95	.367
Incidentals and unforeseen	6,692 70	7.517
Total gross expenditure	$321,150 35	$360.708
Less patient-labour (against market price for farm produce)	19,408 00	21.799
	$301,742 35	$338.909
Less Revenue Account (maintenance of patients)	43,078 91	48.385
Net cost to Government for maintenance of patients	$258,663 44	$290.524

TABLE F.—EXPENSE AND REVENUE STATEMENT OF THE ESSONDALE HOSPITAL FOR 12 MONTHS ENDING MARCH 31ST, 1922—*Continued.*

Remarks.

Total patients in residence, Essondale, March 31st, 1922	924
Daily average population, Essondale, for year	890.32
Gross maintenance *per capita* cost, 1 year	$360.71
„ „ „ 1 day	.988
Net maintenance *per capita* cost, 1 year	290.52
„ „ „ 1 day	.796

Capital Expenditure.

Attendants' cottages	$ 7,312 91
Acute Building	4,242 50
Grading grounds	1,544 29
New laundry machinery	7,627 14
Fire equipment	4,413 45
	$25,140 29

TABLE G.—EXPENSE AND REVENUE STATEMENT OF THE SAANICH HOSPITAL FOR 12 MONTHS ENDING MARCH 31ST, 1922.

Operating Expense Accounts.

Operating expenditure by voucher—		
Salaries—		
Medical and clerical staff	$ 2,820 00	
Other employees	13,788 43	
		$ 16,608 43
Office supplies—		
Books and journals	$ 34 40	
Postage and office supplies	211 50	
Telegrams and telephones	110 53	
		356 43
Travelling expenses		88 09
Fuel, water, light, and power—		
Fuel	$ 5,570 91	
Water	107 94	
Light and power	1,046 10	
		6,724 95
Maintenance and repairs—		
Repairs and renewals	$ 2,512 21	
Janitors' supplies	330 56	
		2,842 77
Furniture and fixtures—		
Bedding	$ 256 95	
Furniture and fixtures	58 35	
Miscellaneous	266 84	
		582 14
Provisions—		
Groceries	$ 7,723 70	
Meats	4,154 19	
Fish	684 06	
		12,561 95
Carried forward		$ 39,764 76

TABLE G.—EXPENSE AND REVENUE STATEMENT OF THE SAANICH HOSPITAL FOR 12 MONTHS ENDING MARCH 31ST, 1922—*Continued.*

Operating Expense Accounts—Continued.

Brought forward		$ 39,764 76
Operating expenditure by voucher—*Continued.*		
Uniforms and clothing—		
Clothing	$ 1,535 95	
Boots and slippers	309 00	
		1,844 95
Medical and surgical supplies—		
Medicines and drugs	$ 379 06	
Surgical supplies	79 92	
		458 98
Examinations, committals, and transportation		284 55
Incidentals and unforeseen—		
Amusements	$ 223 00	
Funerals	49 50	
Auto-repairs	42 40	
Gasolene and oils	2 05	
Tools and implements	24 18	
Freight and cartage	21 55	
Miscellaneous	5,196 97	
		5,559 65
Total expenditure for year by voucher		$ 47,912 89
Institution Trading Accounts—		
New Westminster Hospital—Clothing and uniforms		2,060 50
Colony Farm—Sundry supplies		1,122 25
		$ 51,095 64

Summary of Profit and Loss Accounts.

		Yearly *Per Capita* Cost.
Salaries	$16,608 43	$138.346
Expenses—		
Office supplies	356 43	2.969
Travelling expenses	88 09	.733
Fuel, water, light, and power	6,634 95	55.268
Maintenance and repairs	2,842 77	23.679
Furniture and fixtures	688 81	5.737
Provisions	12,383 94	103.156
Clothing	3,807 19	31.713
Medical and surgical supplies	483 98	4.031
Examinations, committals, and transportation	284 55	2.370
Incidentals and unforeseen	3,681 82	30.669
Total gross expenditure	$47,860 96	$398.671
Less Revenue Account (maintenance of patients)	4,263 65	35.515
Net cost to Government for maintenance of patients	$43,597 31	$363.156

Remarks.

Total patients in residence, March 31st, 1922	126
Daily average population for year	120.05
Gross maintenance *per capita* cost per year	$398.67
„ „ „ per day	1.092
Net maintenance *per capita* cost per year	363.15
„ „ „ per day	.995

REVENUE OF MENTAL HOSPITALS SINCE INCEPTION.

1873	$1,440 99	1893	$ 1,585 40	1913	$40,756 56
1874	680 00	1894	2,709 53	1914	42,731 83
1875	1,342 60	1895	4,409 23	1915, New West.	18,046 21
1876	730 31	1896	3,741 71	1915, Essondale.	16,329 72
1877	799 91	1897	3,816 80	1916, New West.	18,135 91
1878	479 42	1898	4,003 79	1916, Essondale.	21,889 74
1879	867 38	1899	4,769 04	1917, New West.	21,435 93
1880	1,433 04	1900	6,893 33	1917, Essondale.	25,350 09
1881	614 99	1901	12,800 76	1918, New West.	35,169 86
1882	505 18	1902	10,926 23	1918, Essondale.	32,100 14
1883	298 24	1903	13,639 64	1919-20, N. West.	45,921 06
1884	98 35	1904	15,004 22	1919-20, Es'ndale	53,740 40
1885	.....	1905	16,613 18	1919-20, Saanich	3,215 39
1886	50 00	1906	19,058 42	1920-21, N. West.	38,323 55
1887	720 59	1907	20,753 35	1920-21, Es'ndale	46,418 81
1888	750 00	1908	25,807 83	1920-21, Saanich	3,580 31
1889	220 00	1909	25,845 65	1921-22, N. West.	38,409 52
1890	599 24	1910	26,137 38	1921-22, Es'ndale	43,078 91
1891	761 15	1911	30,100 20	1921-22, Saanich	4,263 65
1892	2,418 43	1912	35,151 97		

TAILOR'S REPORT, 1921–22.

ESSONDALE.

Uniforms—		
108 suits at $55	$ 5,940 00	
102 pairs pants at $15	1,530 00	
		$ 7,470 00
Clothing for patients—		
226 suits at $19	$ 4,294 00	
2 suits at $22	44 00	
52 coats at $12.50	650 00	
24 cottonade coats at $3.50	84 00	
15 vests at $3	45 00	
7 pairs pants at $6.50	45 50	
		5,162 50
Repairs—		
2,237 coats at 50 cents	$ 1,118 50	
1,209 vests at 30 cents	362 70	
3,703 pairs pants at 40 cents	1,481 20	
		2,962 40
Miscellaneous work—		
18 pairs boys' pants at $2.50	$ 45 00	
12 chair-seats at $2	24 00	
Sundry repairs, pressings, etc.	35 00	
		104 00
		$15,698 90

COLQUITZ.

Uniforms—		
12 suits at $55	$ 660 00	
10 pairs pants at $15	150 00	
		$ 810 00
Carried forward		$ 810 00

COLQUITZ—*Continued.*

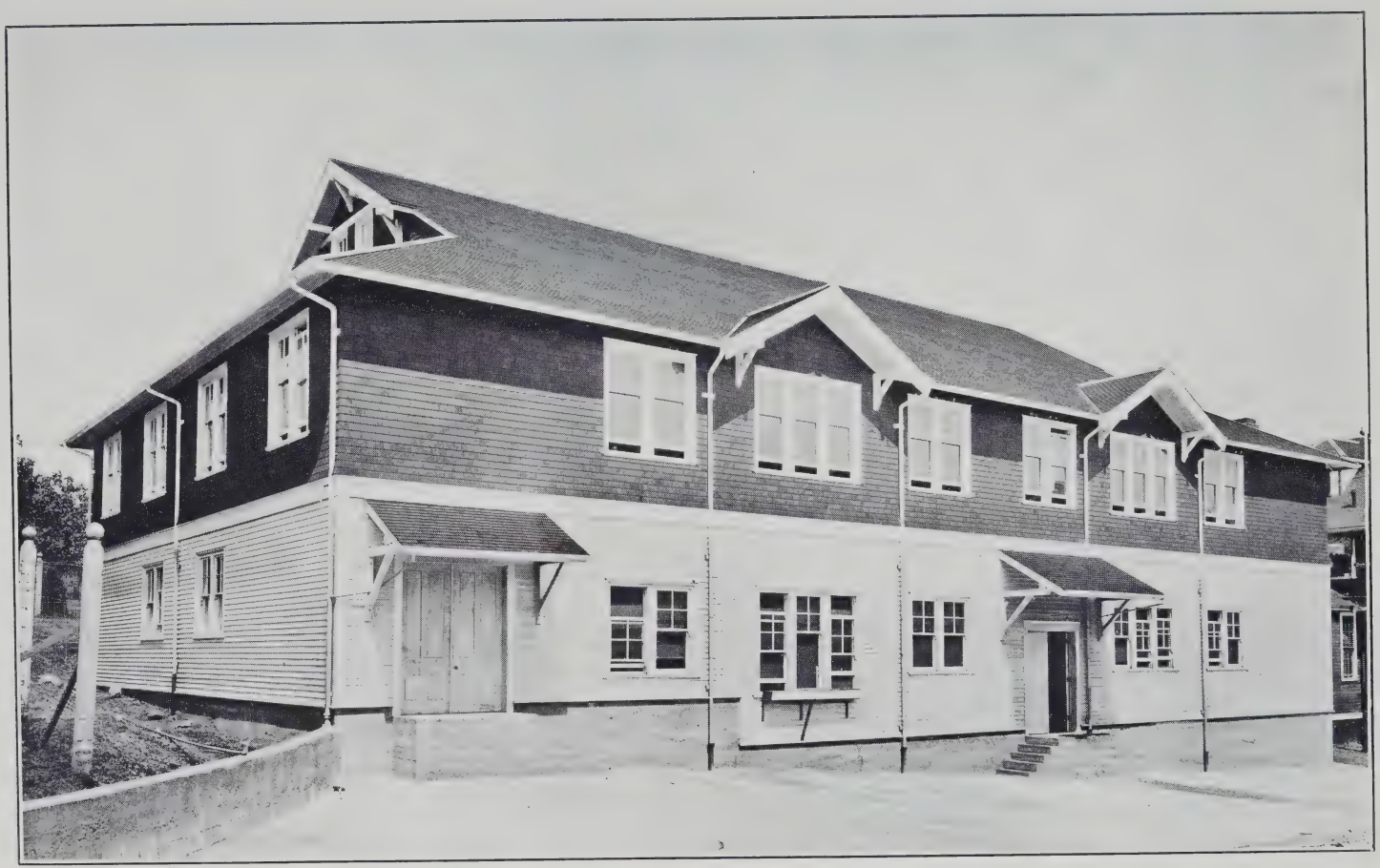
Brought forward		$ 810 00
Clothing for patients—		
61 coats at $12.50	$ 762 50	
72 pairs pants at $6.50	488 00	
		1,250 50
		$ 2,060 50

NEW WESTMINSTER.

Uniforms—		
48 suits at $55	$ 2,640 00	
46 pairs pants at $15	690 00	
		$ 3,330 00
Clothing for patients—		
52 coats at $12.50	$ 650 00	
61 pairs pants at $6.50	396 50	
7 vests at $3	21 00	
		1,067 50
Miscellaneous—		
21 canvas blankets at $7	$ 147 00	
10 camisoles at $4	40 00	
47 bed-ticks (labour only) at 35 cents	16 45	
17 pillow-ticks (labour only) at 10 cents	1 70	
		205 15
Repairs—		
238 coats at 50 cents	$ 119 00	
60 vests at 30 cents	18 00	
546 pairs pants at 40 cents	218 40	
20 camisoles at 50 cents	10 00	
35 blankets (string) at $1.50	51 00	
Odd work, repairs, pressing, etc.	150 00	
		566 40
		$ 5,169 05

STATEMENT OF TAILOR-SHOP, 1921–22.

Production—		
For Mental Hospital, Essondale—		
Attendants' uniforms	$7,470 00	
Patients' clothing	5,162 50	
Repairs	2,962 40	
Miscellaneous	104 00	
		$15,698 90
For Mental Home, Saanich—		
Attendants' uniforms	$ 810 00	
Patients' clothing	1,250 50	
		2,060 50
For Public Hospital for Insane—		
Attendants' uniforms	$3,330 00	
Patients' clothing	1,067 50	
Carried forward	$4,397 50	$17,759 40



Steward's Stores and Occupational Therapy Building at Public Hospital for Insane.

STATEMENT OF TAILOR-SHOP, 1921–22—*Continued.*

Brought forward		$4,397 50	$17,759 40
Production—*Continued.*			
For Public Hospital for Insane—*Continued.*			
Repairs	566 40		
Miscellaneous	205 15		
		5,169 05	
			$22,928 45
Proceeds, sale of rags		5 65	
Material on hand, March 31st, 1922		3,159 73	
			$26,093 83
Costs—			
Material on hand, March 31st, 1921		$ 2,518 70	
Salaries—			
Tailor	$1,320 00		
Assistant tailors	2,400 00		
Seamstresses	2,435 32		
		6,155 32	
Electric power	$ 47 50		
Electric light	30 00		
		77 50	
Material purchased		10,056 67	
			18,808 19
Profit on operations			$ 7,285 64

SHOEMAKER'S REPORT, 1921–22.

NEW WESTMINSTER.

New work—			
90½ pairs men's boots		$ 690 50	
63 pairs men's slippers		248 00	
12 pairs women's slippers		36 00	
6 pairs women's boots		35 00	
			$1,009 50
Repairs—			
284 pairs men's boots		$ 596 15	
131 pairs women's boots		205 20	
			801 35
			$1,810 85

ESSONDALE.

New work—			
6½ pairs men's boots		$ 56 00	
2 pairs men's slippers		8 00	
7 pairs boys' boots		45 00	
8 pairs girls' boots		40 00	
			$ 149 00
Repairs—			
453 pairs men's boots		$ 893 05	
118 pairs men's slippers		166 75	
			1,059 80
			$1,208 80

STATEMENT OF SHOEMAKER-SHOP, 1921–22.

Production—		
New Westminster—		
New work	$1,009 50	
Repairs	801 35	
		$1,810 85
Essondale—		
New work	$ 149 00	
Repairs	1,059 80	
		1,208 80
Material on hand, March 31st, 1922		425 73
		$3,445 38
Costs—		
Salary of shoemaker	$1,320 00	
Material purchased	1,844 42	
Light and power	35 00	
Material on hand, March 31st, 1921	137 32	
		3,336 74
Profit on operations		$ 108 64

PRODUCTION TABLES.

WORK DONE BY MALE PATIENTS, NEW WESTMINSTER, 1921–22.

	Days.		Days.
Auto-truck	363	Poultry	730
Baker	1,075	Painter	750
Carpenter	483	Piggery	2,190
Dining-room	5,916	Plaster	665
Engineer	730	Plumber	347
Farmer	6,464	Porter	1,095
Florist	330	Scullery	942
Gardener	2,955	Shoemaker	866
Gate	346	Tailor	588
Kitchen	2,619	Teamster	697
Laboratory	365	Wards	5,554
Laundry	2,161	Cemetery	611
Lawns	2,291		

WORK DONE BY PATIENTS, ESSONDALE, 1921–22.

	Days.		Days.
Attic	4,745	Grade	234
Billiard-room and basement	4,380	General work	1,994
Bake-shop	900	Industrial School	4,032
Carpenter	530	Kitchen	3,285
Civil Engineer	655	Lawns	1,696
New cottages	1,851	Laundry	8,400
Coal	1,321	Mason and plasterer	3,100
Colony Farm extras	923	Painter	1,882
Cement pipe	404	Piggery	1,387
Cement brick	144	Stable and teaming	714

WORK DONE BY PATIENTS, ESSONDALE, 1921–22—*Continued.*

	Days.		Days.
Chores	899	Rock and crushing	1,238
Dining-room	7,665	Roads	59
Dykes, drains, and ditches	2,755	Tool-house	299
Engineer	1,120	Water-main (new)	1,339
Farm and nursery	19,408	Ward-work	44,165
General parole-work	3,650		

ARTICLES MADE BY FEMALE PATIENTS, NEW WESTMINSTER, 1921–22.

Aprons	200	Sheets	676
Blouses	...	Table-cloths	72
Chemises	288	Roller-towels	211
Curtains, pairs	56	Tea-towels	88
Dresses, gingham	113	Tray-cloths	223
„ night	54	Table-napkins	66
Handkerchiefs	330	Pillow-slips	342
Neckties	364	Pillow-shams	15
Mats, rag	8	Hand-towels	36
Petticoats	55		

ARTICLES MADE FOR NURSES, NEW WESTMINSTER, 1921–22.

Aprons	159	Cuffs, pairs	91
Caps	77	Dresses	40

ARTICLES MADE FOR ESSONDALE AT NEW WESTMINSTER, 1921–22.

Aprons, kitchen	12	Pillow-slips	669
Caps, cook	6	Sheets	191
Curtains, pairs	20	Table-cloths	107

MENDING DONE FOR FEMALE PATIENTS, NEW WESTMINSTER, 1921–22.

Aprons	239	Sheets	1,182
Blankets, wool	285	Skirts	1,953
Blouses	259	Spreads	316
Chemises	1,061	Table-cloths	207
Drawers, pairs	1,892	Bath-towels	50
Dresses, gingham	1,729	Roller-towels	37
„ serge	512	Bed-ticks	140
„ night	907	Pillow-ticks	6
Hose, pairs	4,346	Undervests	1,911
Pillow-slips	164		

MENDING DONE FOR MALE PATIENTS, NEW WESTMINSTER, 1921–22.

Aprons	190	Table-cloths	153
Blankets, wool	274	Bath-towels	239
Drawers, pairs	2,641	Roller-towels	87
Pillow-slips	118	Bed-ticks	95
Sheets	1,180	Pillow-ticks	39
Top shirts	2,152	Coats, white	77
Undershirts	2,420	Sweaters	14
Socks, pairs	11,660	Overalls	56
Spreads	402		

MENDING DONE FOR NURSES, NEW WESTMISTER, 1921–22.

Aprons	249	Dresses	173

SUPPLIES, NEW WESTMINSTER.

FRUIT PUT UP, 1921–22.

	Quarts.		Quarts.
Apple jelly	40	Gooseberries	30
Red-currant jelly	25	Raspberries	25
Cherries	52	Red currants	36
Strawberries	40	Plums	72
Rhubarb	90	Pears	22

PICKLES PUT UP, 1921–22.

	Quarts.
Tomato	80

SUPPLIES RECEIVED FROM HOME FARMER, 1921–22.

Dressed chicken, lb.	292¾	Dressed pork, lb.	10,956
Dressed duck, lb.	330¼	Fresh eggs, doz.	1,164

GARDEN PRODUCE, 1921–22.

Fruit.

Apples	4,102 lb.	Raspberries	204 lb.
Cherries	125 „	Gooseberries	386 „
Strawberries	761 „	Plums	550 „

Vegetables.

Beets	2,307 lb.	Onions, cooking	2,524 lb.
Beans, green	106 „	Parsnips	6,000 „
Chard	1,434 „	Parsley	34 bunches.
Carrots	5,540 „	Peas, green	70 lb.
Cabbage	18,874 „	Potatoes, early	1,176 „
Cauliflower	60 „	„ late	13,780 „
Celery	40 heads.	Rhubarb	4,542 „
Corn, green	930 doz.	Tomatoes, ripe	...
Cucumbers	55 „	„ green	1,265 „
Lettuce	305 heads.	Turnips	1,078 „
Onions, green	484 lb.	Vegetable marrow	1,601 „

SUPPLIES, SAANICH.

FARM AND GARDEN PRODUCE, MENTAL HOME, COLQUITZ, 1921–22.

Vegetables and Feed.

Apples	1,342 lb.	Onions, dry	2,355 lb.
Beans, broad	55 „	Parsnips	3,115 „
„ dwarf	446 „	Peas, green	362 „
Cabbage	2,687 „	Pears	164 „
„ red	158 „	Potatoes	42,561 „
Carrots	13,691 „	Rhubarb	1,115 „
Cauliflower	579 heads.	Radishes	373 bunches.
Citrons	66 lb.	Raspberries	49 lb.
Corn, sweet	1,025 ears.	Swiss chard	350 „
Crabs	143 lb.	Tomatoes	751 „
Celery	270 heads.	Turnips, white	135 „
Cucumbers	77	„ swede	3,049 „
Kale	230 lb.	Black-caps	37 „
Lettuce	2,180 heads.	Beets	1,821 „

Rockery, Nurses' Home, Public Hospital for Insane, New Westminster.

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FARM AND GARDEN PRODUCE, MENTAL HOME, COLQUITZ, 1921-22—*Continued.*

Vegetables and Feed—Continued.

Leeks	223 bunches.	Hay, oat	30,000 lb.
Melons	20	„ timothy	4,000 „
Marrows	59	Roots	30,000 „
Onions, green	636 bunches		
Seeds, miscellaneous	$ 45 90	By Vegetables and feed	$1,758 86
„ potatoes	60 00		
Manure	164 00		
Fertilizer, patent	86 50		
Profit	1,402 46		
	$1,758 86		$1,758 86

Dairy (4 Cows).

Maintenance	$ 631 00	Milk produced, 31,803.7 lb.	$1,101 86
Profit	470 86		
	$1,101 86		$1,101 86

By Profit, milk	$470 86
Heifer calves to Colony Farm, 2 at $100	200 00
Total profit	$670 86

Piggery.

Maintenance	$458 65	Dressed pork	$619 44
Profit	346 39	Increase stock	185 60
	$805 04		$805 04

Chickens.

Maintenance	$209 70	Eggs and poultry	$412 99
Profit	287 04	Increase stock	83 75
	$496 74		$496 74

Eggs, $692^{10}/_{12}$ dozen; dressed fowl, 220 lb.

Rabbits.

Maintenance	$103 50	Dressed rabbit	$224 90
Profit	187 90	Increase stock	66 50
	$291 40		$291 40

Summary.

To Profit, vegetables and feed	$1,402 46
„ dairy	670 86
„ piggery	346 39
„ chickens	287 04
„ rabbits	187 90
Total profit	$2,894 65

N.B.—All prices are based on wholesale market value on day of consumption.

PART III.—COLONY FARM.

FARM SUPERINTENDENT'S REPORT.

ESSONDALE, B.C., March 31st, 1922.

Dr. H. C. Steeves, B.A., M.D., C.M.,
General Medical Superintendent, Public Hospital for Insane,
New Westminster, B.C.

SIR,—I have the honour to submit herewith report on Colony Farm operations for the twelve months ending March 31st, 1922.

A number of factors contributed to make this season one of the least profitable that the farming community in this Province has ever experienced, and this farm was singularly unfortunate, in that it was completely inundated during the heavy rains in October last when the City of Coquitlam was flooded and the Canadian Pacific Railway and traffic bridges washed out.

As a result of prompt action on the part of the staff, not a head of live stock was lost, but the damage to other property was necessarily considerable. The bridge that connected the home farm with the Wilson Annex was washed out shortly after it had been repaired at a cost of some $1,000. It has since been replaced by a new bridge at a cost of $7,571.89. Roads, sidewalks, fences, and small bridges were badly damaged and considerable expense was incurred in repairing them. The dykes were badly damaged and required a great deal of work to put them into shape. Nearly a mile of dyke was raised from 1 to 3 feet.

Crops were on the whole fairly satisfactory. In the course of the system of rotation which we practise it was necessary to sow oats on land which was not, to the best degree, adapted for them, so that the yield was less than has been usual. Potatoes were a very good crop, but some 70 tons were lost and the keeping qualities of others impaired as a result of the flood.

A considerable loss was suffered through shrinkage and rot, but it is hoped that this will be eliminated for the future, as adequate storage facilities have now been provided.

The chief loss was entailed in writing down live-stock inventories to present market prices. It is a matter of common knowledge that all live stock depreciated in value at least 40 per cent. during the year, so that the loss from this source alone was very heavy. All values shown in the inventories at this date are conservatively based on ruling market prices. Another source of loss was the very low prices which have obtained on all farm products. While the prices of feed have ruled somewhat lower, they have not fallen to the extent that dairy products have.

Good progress has been made on development-work, and some 10,000 feet of new ditches were dug during the year and all the dykes and dyke fences cleared of superfluous growth.

The force of work-horses is equal in number to that of last year, but it now includes some young mares which are also used as brood mares. The exclusively brood mares (seven in number) were transferred to the University of British Columbia as a free gift.

The size of the herd of cattle has been maintained during the year, and I am pleased to report a decided improvement in its general health and condition. Over 821,000 lb. of milk were produced, which is an increase of some 91,000 lb. over the previous year. The Bang herd which we maintained for the offspring produce was destroyed in August last. This entailed a considerable loss, but has made possible the accreditization of our herd, which we hope will be complete on the next test. No females were disposed of, but a considerable number of young sires were sold to dairymen in the Province at an average price of $232.50, which was in keeping with the market tendency. Two young sires were sold without the Province at an average price of $400. The entire herd is now practically our own breeding, including the four herd sires.

The usual small flock of sheep has been maintained, but conditions do not permit us to keep a sufficient number to supply the institutions with all the mutton they require.

The usual number of hogs has been kept for the consumption of garbage from the institutions. This food, slightly supplemented, has kept the institutions supplied with fresh pork. All the hogs used were bred on the place. This department offers excellent opportunities for future development.

The Poultry Department gave very unsatisfactory results for the year and steps are being taken to put this department in such a position that it will produce a sufficient quantity of eggs and meat of the quality required by the institutions.

We have continued to maintain a very considerable nursery of ornamental shrubs and trees. This is some 12 acres in extent, and, while we distribute a large quantity of stock to various institutions and schools throughout the Province, the caring for this large nursery occupies so much of the time of the two paid men that it has militated against the production of early vegetables for your institutions. On account of frosts and the late spring the crop of apples and small fruits was decidedly under the average. The production of early vegetables will be developed to a much greater extent for another year.

I am glad to be able to report that, on resuming the position of Farm Superintendent in September last, I found the farm in excellent shape and the work being most efficiently carried on by the Acting-Superintendent, Mr. R. Gardner.

All of which is respectfully submitted.

P. H. MOORE,
Farm Superintendent.

BURSAR'S REPORT.

ESSONDALE, B.C., July 24th, 1922.

H. C. Steeves, B.A., M.D., C.M.,
General Medical Superintendent, Mental Hospitals,
New Westminster, B.C.

SIR,—In reviewing the Profit and Loss Account and other financial statements covering operations on Colony Farm for the fiscal year ending March 31st, 1922, I wish to point out certain losses which are responsible for the unfavourable showing of last year.

On Mature Cows Account alone, over $11,000 was written off, $7,321 of which was on account of revaluation of stock under that heading, and practically the balance was made up of matured cows known as the T.B. or Bang herd, which was destroyed, the elimination of which placed Colony Farm in the accredited-herd class.

In the Bull Department a heavy loss was sustained by destroying "Aaggie Cornucopia Newman," who for some time past was held with the quarantine herd. There was also a good sum written off the other animals by Superintendent Moore.

Under Work-horse Department the sum of $1,215 was written off in revaluation, while other losses were made by death or disposing of horses, which in the judgment of the farm authorities should be sold even at a loss on account of age or deformation.

Shrinkage and Rot Account is responsible for the loss of $5,781.37, which was more than double that of the previous year, but this is largely due to the Coquitlam flood, which impaired the keeping qualities of the vegetables and roots, as stated by the Farm Superintendent. As the result of the flood and the shrinkage our potato-supply ran very close this summer.

On the profit side of the ledger a reasonable sum was made in the dairy and herd, amounting to $2,275.58, which produced milk at 41⅝ cents per gallon.

Work-horses show a profit of $4,772.22 this year, against $3,907.03 last year, an increase of $865.19, while the cost per horse-hour was reduced from 39 cents last year to 36⅔ cents this year, on a work production of 3,584.44 hours of team-labour.

Truck-garden and nursery shows a profit of $1,871.44 for the year, as compared with $3,172.92 for the former year, a reduction of $1,301.48.

In Crops Department a profit of over $9,215.25 was made under various headings, principal crop of which was potatoes, which produced less per ton and cost more per ton in comparison with the former year. The acreage for potatoes this year was 36.80, compared with 46.73 last year.

The heaviest operating account of the farm, however, is under the heading of "Maintenance, Repairs, and Administration." This included salaries of officials and all vouchers for material of all descriptions for upkeep and repairs in general, together with fuel, board of employees, horse-labour, etc.

The flood again was responsible here for the large increase over former years' expenditure, as replacements of roads, dykes, sidewalks, fences, etc., were necessary, while painting and repairs of innumerable other fixtures was done, such as drying and rewinding motors in pump-

house, renewing telephone and fire-alarm wiring, etc. In fact, the flood damage is very hard to estimate, but undoubtedly has proved costly and reflects itself in our operation statement for the year under review.

All of which is respectfully submitted.

G. S. MACGOWAN,
Bursar.

BALANCE-SHEET, COLONY FARM AND BRANCHES.

APRIL 1ST, 1921, TO MARCH 31ST, 1922.

Assets.

		Assets.	Liabilities.
Land Account—			
Colony Farm	$156,807 26		
Wilson Annex	54,253 60		
		$211,060 86	
Buildings		174,557 73	
Water system		4,311 25	
Bridge		7,571 89	
Fencing, pavement, etc.		57,008 82	
Equipment		23,781 25	
Live stock—			
Bulls, as per inventory	$ 1,500 00		
Cows, as per inventory	29,553 72		
Young cattle, as per inventory	6,662 11		
Stallions, as per inventory	500 00		
Work-horses, as per inventory	5,900 00		
Young horses, as per inventory	2,182 47		
Sheep, as per inventory	1,496 50		
Hogs, as per inventory	3,638 08		
Poultry, as per inventory	1,493 54		
		52,926 42	
Sundry inventories—			
Poultry-feed	$ 38 50		
Feed	9,662 82		
Gasolene	67 15		
Cream	5 40		
Nursery and truck-garden	44,264 25		
		54,038 12	
Accounts receivable—			
Boys' Industrial School	$ 179 86		
Sundry accounts receivable	832 35		
Sundry notes receivable	800 00		
		1,812 21	
Growing Crops Apportionment Account		6,072 71	

Liabilities.

Suspense Account		.....	$ 183 48
Uphill Account		.....	239 98
Surplus Account	$741,172 41		
Loss to March 31st, 1921	$30,776 13		
Loss Account, Sunbury	9,655 60		
	40,431 73		
	$700,740 68		
Loss for year ending March 31st, 1922	32,884 88		
	$667,855 80		
Less Patient-labour Account	75,138 00		
			592,717 80
		$593,141 26	$593,141 26

PROFIT AND LOSS ACCOUNT.

YEAR ENDING MARCH 31ST, 1922.

Departments.	Debits.	Credits.	Loss (Deaths).	Loss.	Gain.	Acreage.	Costs.
Dairy and herds	$34,258 53	$36,534 11	.....	.....	$2,275 58	....	
Bulls, sales and deaths	1,909 65	60 00	$ 359 65	$1,490 00	.....	....	
Service Account	.....	5 00	.....	.....	5 00	....	
Cows, sales and deaths	11,925 81	476 81	2,818 85	8,630 15	.....	.. .	
Young cattle, sales and deaths	4,910 83	4,560 44	14 80	335 59	.....	....	
Young horses, sales and deaths	835 63	.....	.....	835 63	.....	. ..	
Stallion	500 00	.....	.....	500 00	.....	....	
Work-horses, Labour Account	14,447 20	19,219 42	.....	.....	4,772 22	....	
" sales and deaths	2,120 00	225 00	180 00	1,715 00	.....	....	
Sheep	2,686 78	2,034 79	.....	651 99	.....	...	
Hogs	9,916 80	9,863 02	.....	53 78	.....	....	
Poultry	4,947 59	4,635 50	.....	312 09	.....	....	
Nursery and garden	58,753 40	60,624 84	.....	.....	1,871 44	....	
Tractor Account	1,890 28	1,536 25	.....	354 03	.....	....	
Exhibition expenses	452 20	... .	.....	452 20	.....	....	
Crops, potatoes	5,386 17	11,264 72	.....	.....	5,878 55	36 80	Yield per acre, 13.94 tons; cost a ton, $10.49.
" oats	2,808 52	3,020 00	.....	.....	211 48	82 25	" 1,702 lb.; " 21.97.
" hay	2,323 45	3,906 25	.....	.....	1,582 80	101 06	" 2.02 tons; " 7.26.
" ensilage	2,439 95	2,762 50	.....	.....	322 55	61 45	" 8.99 " ; " 4.41.
" onions	174 50	220 00	.....	.....	45 50	2 00	" 2,750 lb.; " 63.45.
" carrots	201 50	291 50	.....	.....	90 00	2 60	" 15.54 tons; " 4.98.
" turnips and mangels	1,417 60	1,507 72	.....	.....	90 12	20 60	" 10.45 " ; " 6.58.
Pasturage Account	.....	994 25	.....	.....	994 25	....	
Shrinkage and rot	5,781 37	.....	.....	5,781 37	.....	....	
Maintenance and administration	26,539 24	.....	.....	26,539 24	.....	....	
	$196,627 00	$163,742 12	$3,373 30	$47,651 07	$18,139 49	....	
				18,139 49	.....	....	
				$29,511 58	Loss on operations (exclusive of deaths of stock and patient-labour).		
				3,373 30	Loss from deaths of stock.		
				$32,884 88	Total loss.		

Patient-labour for year, $21,208.

DAIRY AND HERDS DEPARTMENT.

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1922.

Expenses.

Total expenses for 12 months	$34,204 68	
March 31st, 1921. Inventory	19 45	
		$ 34,224 13

Production.

Dairy produce supplied institutions	$36,276 44	
Prize-money received from associations	217 87	
March 31st, 1922. Inventory	5 40	
		36,499 71
Profit in dairy, 12 months		$ 2,275 58

PRODUCTION AND COSTS ACCOUNT, MARCH 31ST, 1922.

			Production. Lb. Milk.
Dairy—			
Salaries and upkeep	$3,262 31		
Coal	1,189 11		
		$ 4,451 42	
Test-cows—			
Salaries and upkeep	$2,871 85		
Board of employees	1,552 00		
Feed	7,343 51		
Sundries	2 10		
		11,769 46	269,610.7
General herd—			
Salaries and upkeep	$4,543 80		
Feed	9,396 67		
Board of employees	1,838 00		
Pasturage	578 00		
Horse-labour	355 50		
		16,711 97	528,276.8
T.B. herd—			
Salaries and upkeep	$ 302 57		
Board of employees	144 00		
Feed	1,336 26		
Sundries	85 00		
		1,867 83	23,364.2
		$34,800 68	
Less allowance for manure		596 00	
		$34,204 68	
March 31st, 1921. Inventory		19 45	
		$34,224 13	821,251.7

MILK PRODUCTION, MARCH 31ST, 1922.

1921.	Production. Lb.	Cost.
April	67,053.0	$ 3,763 92
May	73,073.3	2,081 07
June	66,436.0	2,575 26
July	72,142.5	2,614 00
August	70,879.0	2,849 40
Carried forward	349,583.8	$13,883 65

DAIRY AND HERDS DEPARTMENT—*Continued.*

MILK PRODUCTION, MARCH 31ST, 1922—*Continued.*

1921.	Production. Lb.	Cost
Brought forward	349,583.8	$13,883 65
September	62,424.1	2,475 90
October	64,182.3	2,588 73
November	63,651.8	3,108 52
December	65,543.2	2,992 89
1922.		
January	73,154.9	3,134 66
February	66,136.9	3,205 09
March	76,574.7	2,815 24
Totals	821,251.7	$34,204 68

Average cost of production, 41⅝ cents per gallon.

BULL DEPARTMENT.

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1922.

Name of Animal.	Asset Value.	Selling-price.	Remarks.
Colony McKinley Segis de Kol	$ 250 00	.....	Slaughtered.
Aaggie Cornucopia Newman	1,000 00	$60 00	Butchered.
Colony Perfection Valdessa (half-interest)	109 65	....	Died.
Depreciation account, Colony Prince Posch Paul	550 00	.....	
	$1,909 65	$60 00	
	60 00		
Loss	$1,849 65		

BULL SERVICE ACCOUNT—PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1922.

Receipts.

H. Gowan	$5 00

MATURE COW DEPARTMENT.

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1922.

	Name of Animal.	Asset Value.	Selling-price.	Remarks.
1921.				
April 30.	Colony Grebegga McKinley	$ 300 00	$96 46	Butchered.
May 2.	Koba de Kol	200 00	.....	Destroyed.
June 10.	Zarilda Clothilde 3rd de Kol	125 00	.....	Died.
" 11.	Colony Belle Valdessa	393 85	.....	"
Aug. 8.	Colony Jemima Wayne	125 00	.....	Destroyed.
	Colony Princess Korndyke	100 00	.....	"
	Colony Alma Segis	100 00	.....	"
	Colony McKinley Canary	125 00	.....	"
	Colony Lady Aaggie Newman	125 00	.....	"
	Colony Aaggie McKinley	125 00	.....	"
	Colony Vrouka Pride	125 00	.....	"
	Colony Marie Jensen McKinley	125 00	.....	"
	Colony Sylvia Newman	125 00	.....	"
Dec. 12.	Colony Beets Cornucopia	175 00	57 75	Butchered.
	Colony Wimple Westport Posch	200 00	82 50	"
	2 hides sold J. Leckie Co	.....	6 55	
Dec. 22.	Pearl Mechthilde of Beaverland	300 00	.....	Died.
	Colony Natalie McKinley	450 60	54 45	Butchered.
Dec. 28.	Colony Sena Newman	200 00	73 00	"
	Colony Alma Korndyke	300 00	56 10	"
1922.				
Feb. 6.	S. C. P. Rag Apple Lottie	275 00	.....	Died.
	Colony Lakeside McKinley	450 00	.....	"
	Colony Beets Segis	150 00	50 00	Butchered.
	Swift Canadian Co. (cost of killing)	9 70	.....	
	Loss on revaluation of herd by Farm Superintendent	7,321 66	.....	
		$11,925 81	$476 81	
		476 81		
	Loss	$11,449 00		

Abstract of Loss.

Deaths and destroyed	$ 2,818 85
Loss on cows butchered	1,308 49
Loss on revaluation	7,321 66
	$11,449 00

YOUNG CATTLE DEPARTMENT.

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1922.

	Name of Animal.	Asset Value.	Selling-price.	Remarks.
1921.				
April 30.	Colony Pietje Ormsby	$ 13 86	$ 17 60	Butchered.
	Colony Beaverland Prince	20 79	18 70	"
	Colony Albino Posch	27 72	18 70	"
	Colony Chief Champion	159 39	56 98	"
	Colony Schuilling Ormsby	228 69	57 12	"
May 31.	Colony Major Newman	188 73	200 00	Sold.
	Colony Mercedes Newman	229 20	150 00	"
	Colony Lord Aaggie Champion	263 91	700 00	"
July 31.	Colony Bos McKinley	72 45	100 00	"
	Colony Sir Albert McKinley	24 84	12 00	Butchered.
	Colony Zarilda McKinley	13 80	.....	Died.
	Colony Mechthilde Ormsby	6 90	11 70	Butchered.
	Colony John McKinley	22 68	16 35	"
Oct. 6.	Colony Fayne McKinley	103 36	46 50	"
	Colony Cornelias Posch	85 12	37 50	"
	Colony Ormsby Posch	48 64	19 50	"
	Colony Admiral Newman	27 36	18 00	"
	Colony Hector Posch	36 48	19 50	"
	Colony Champion Posch	24 32	16 50	"
	Colony Emperor Posch	12 16	16 50	"
	Colony Mercena Posch	9 12	15 75	"
Oct. 14.	Colony Sadie Vale Champion	228 00	89 60	"
	Colony Prince McKinley	170 24	71 40	"
	Colony Colanthus Newman	164 16	65 80	"
Oct. 24.	Colony Tensen Count	15 20	15 00	"
" 14.	Colony Moderation Newman	142 88	63 70	"
" 24.	Colony DeKol Count	6 08	10 80	"
	Colony Lakeside Count	1 00	.....	Died.
Oct. 31.	13 hides sold J. Leckie & Co	.....	16 17	
Nov. 7.	Colony Lakeside Posch	140 87	200 00	Sold.
	Colony McKinley Perfection	205 18	36 30	Butchered.
	Colony Sir McKinley Newman	177 62	36 30	"
Dec. 9.	Colony Sadie Vale Newman	94 80	150 00	Sold.
" 22.	Colony Yvonne McKinley	448 72	52 40	Butchered.
1922.				
Jan. 31.	Colony Aldyke McKinley	288 20	200 00	Sold.
Feb. 4.	Colony Westport Posch	121 25	250 00	"
" 6.	Colony Friend McKinley	154 90	200 00	"
" 28.	Colony Lord Posch	198 70	500 00	Traded.
	Colony Faforit Boy Posch	107 76	400 00	Sold.
Mar. 9.	Colony McKinley Count	111 20	175 00	"
" 23.	Colony Herbert Newman	17 37	8 74	Butchered.
	Colony Finerne Posch	13 90	11 59	"
	Colony Lad Newman	6 95	8 74	"
Mar. 31.	Colony Posch Champion	337 07	400 00	Transferred.
	Deposit Account, Col. Posch Champion II	...	50 00	Sold.
	Freight Account, Colony Lord Posch	92 50	.....	
	Expenses Account, Colony Lord Posch	46 76	.....	
		$4,910 83	$4,560 44	
		4,560 44		
	Loss	$ 350 39		

Abstract of Loss.

Deaths	$ 14 80
Losses on cattle butchered and destroyed	1,562 29
	$1,577 09
Profits on sales	1,226 70
Loss	$ 350 39

YOUNG HORSE DEPARTMENT.

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1922.

Name of Animal.	Asset Value.
Colony Lady Pride (written-off value on transfer to work-horses)	$403 16
Colony Lady Dunure (written-off value on transfer to work-horses)	432 47
	$835 63

STALLION DEPARTMENT.

Colony Everlasting Favourite (written-off value)	$500 00

WORK-HORSE DEPARTMENT.

SALES AND DEATHS ACCOUNT, MARCH 31ST, 1922.

Name of Animal.	Asset Value.	Selling-price.	Remarks.
1922.			
Jan. 31. Colony Forest Queen	$ 180 00	....	Died.
Feb. 6. Prince	350 00	$115 00	Sold.
Belle	175 00	75 00	"
Doll	200 00	35 00	"
Written off on revaluation by Farm Superintendent	1,215 00	.....	
	$2,120 00	$225 00	
	225 00		
Loss	$1,895 00		

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1922.

Expenses.

Salaries and upkeep	$6,629 83	
Feed for horses	5,422 87	
Board of employees	2,509 50	
Sundries	77 00	
		$14,639 20
Less allowance for manure	$ 192 00	
„ teamsters' salaries reversed	917 42	
„ blacksmith-work for public works	380 00	
		1,489 42
		$13,149 78

Returns.

Horse-labour charged to Crop and other departments at 50 cents per one horse-hour	$17,922 00
Profit	$ 4,772 22

NOTE.—Against outlay of $13,149.78, 35,844 hours of team-labour were performed at a cost of 36⅔ cents per one horse-hour.

WORK-HORSE DEPARTMENT—*Continued.*

Horse-labour performed, March 31st, 1922.

1921.	Hours.	Cost.
April	3,733½	$ 1,512 84
May	3,628	1,366 20
June	2,994	1,209 35
July	3,001½	1,103 76
August	3,172½	1,103 03
September	3,044	1,052 85
October	2,643	1,158 17
November	2,669½	1,251 23
December	2,315	1,216 78
1922.		
January	2,425	1,123 10
February	2,470	1,203 47
March	3,748	1,146 42
	35,844	$14,447 20
Less blacksmith-work, etc.		1,297 42
Cost		$13,149 78

Cost, 36⅔ cents per hour on basis of one horse-hour.

SHEEP DEPARTMENT.

Profit and Loss Account, March 31st, 1922.

Receipts.

By Sales—			
1 ram, J. Fraser Co.	$ 75 00		
130 pelts, W. Jones	39 06		
34 pelts, A. Ferrick	11 90		
B.C. Wool-growers' Association, settlement	44 47		
2,469 lb. lamb and mutton supplied Mental Hospital	367 86		
		$ 538 29	
Inventory, March 31, 1922—			
25 aged ewes, pure-bred	$ 437 50		
11 shearling ewes, pure-bred	154 00		
4 shearling rams, pure-bred	100 00		
3 2-year-old rams, pure-bred	90 00		
1 aged ram, pure-bred	75 00		
42 aged ewes, grade	420 00		
19 shearling ewes, grade	190 00		
4 shearling wethers, grade	30 00		
		1,496 50	
			$ 2,034 79

Expenses.

Vouchers	$ 65 39		
Feed	506 14		
Horse-labour	3 00		
Pasturage	201 25		
		$ 775 78	
Carried forward		$ 775 78	$ 2,034 79

SHEEP DEPARTMENT—*Continued.*

PROFIT AND LOSS ACCOUNT—*Continued.*

Expenses—Continued.

Brought forward		$ 775 78	$ 2,034 79
Inventory, March 31, 1921—			
26 aged ewes, pure-bred	$ 650 00		
12 shearling ewes, pure-bred	240 00		
1 aged ram, pure-bred	100 00		
7 shearling rams, pure-bred	140 00		
36 aged ewes, grade	540 00		
11 shearling ewes, grade	187 00		
3 shearling wethers, grade	54 00		
		1,911 00	
			2,686 78
Loss			$ 651 99

HOG DEPARTMENT.

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1922.

Receipts.

By Sales—			
Live hogs, 6 head	$ 311 00		
11,224 lb. pork to New Westminster Hospital	1,893 04		
25,758 lb. pork to Essondale Hospital	4,020 90		
		$6,224 94	
Inventory, March 31, 1922—			
Essondale, 76 hogs, 12,226 lb.	$ 978 08		
New Westminster—			
20 hogs, 1 year old	400 00		
20 „ 10 months old	300 00		
8 „ 7 „	120 00		
18 „ 6 „	270 00		
19 „ 3 „	190 00		
10 „ 4 weeks old	50 00		
11 „ 3 „	55 00		
30 „ 2 „	150 00		
9 „ 1 week old	35 00		
22 brood sows	990 00		
2 boars	100 00		
		3,638 08	
			$ 9,863 02

Expenses.

Boar purchased from Agassiz	$ 15 00		
Salaries	1,027 60		
Feed	2,758 75		
Horse-labour	596 50		
Coal	54 00		
		$4,451 85	
Inventory, March 31, 1921—			
Essondale	$ 864 95		
New Westminster	4,600 00		
		5,464 95	
			9,916 80
Loss			$ 53 78

HOG DEPARTMENT—*Continued.*

ESSONDALE INSTITUTION—PORK SUPPLIED BY COLONY FARM, MARCH 31ST, 1922.

1921.			
April.	8 hogs, 1,824 lb. at 20–21 cents	$	373 86
May.	9 „ 2,271 „ 18–20 „		431 40
June.	5 „ 1,470 „ 14–18 „		228 64
July.	5 „ 1,624 „ 14–17 „		245 77
Aug.	6 „ 2,070 „ 19 „		409 73
Sept.	6 „ 1,827 „ 18–20 „		349 50
Oct.	6 „ 1,831 „ 16–18 „		299 60
Nov.	5 „ 1,632 „ 14–17 „		247 64
Dec.	6 „ 1,648 „ 13–14 „		222 53
1922.			
Jan.	9 „ 2,479 „ 14 „		347 06
Feb.	7 „ 1,550 „ 15–16 „		240 89
„	13 „ 3,900 „ 09 „ (live)		351 00
March.	8 „ 1,632 „ 16–17 „		273 28
	Total (25,758 lb.)	$	4,020 90

NEW WESTMINSTER INSTITUTION—PORK SUPPLIED BY COLONY FARM, MARCH 31ST, 1922.

1921.			
April.	4 hogs, 601 lb. at 21 cents	$	126 21
May.	5 „ 808 „ 19 „		153 52
June.	4 „ 810 „ 14–18 „		129 66
July.	4 „ 802 „ 17 „		136 34
Aug.	5 „ 1,048 „ 20 „		209 60
Sept.	4 „ 965 „ 18–20 „		183 35
Oct.	5 „ 1,254 „ 16–18 „		200 64
Nov.	4 „ 1,116 „ 16–17 „		178 56
Dec.	4 „ 896 „ 13–14 „		125 44
1922.			
Jan.	5 „ 1,134 „ 14 „		158 76
Feb.	4 „ 878 „ 16 „		140 48
March.	4 „ 912 „ 16–17 „		150 48
	Total (11,224 lb.)	$	1,893 04

POULTRY DEPARTMENT.

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1922.

Receipts.

6,187 dozen eggs supplied Mental Hospital, Essondale	$2,142 22	
2,333 lb. dressed poultry supplied Mental Hospital, Essondale	930 74	
42 lb. feathers supplied Mental Hospital, Essondale	10 50	
20 dozen setting-eggs supplied New Westminster Hospital	20 00	
		$3,103 46
Inventory, March 31, 1922—		
399 Leghorn pullets	$ 798 00	
230 „ hens	345 00	
56 Rhode Island Red pullets	140 00	
40 „ „ hens	60 00	
Carried forward	$1,343 00	$3,103 46

POULTRY DEPARTMENT—*Continued.*

PROFIT AND LOSS ACCOUNT—*Continued.*

Receipts—Continued.

Brought forward	$1,343 00	$ 3,103 46	
Inventory—*Continued.*			
12 cockerels	24 00		
80 baby chicks	36 00		
261 „	78 30		
51 dozen eggs	12 24		
		1,493 54	
Feed, etc.		38 50	
			$ 4,635 50

Expenses.

Salaries, etc.	$ 731 40		
Feed	1,789 13		
Horse-labour	300 00		
Coal	114 00		
		$2,934 53	
Inventory, March 31, 1921	$1,872 59		
„ feed	140 47		
		2,013 06	
			4,947 59
Loss			$ 312 09

TRUCK-GARDEN AND NURSERY.

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1922.

Receipts.

Potato-seed supplied farm	$ 814 25		
„ sold	37 50		
Hog and cattle feed	816 56		
Shrubs, etc., to public institutions	2,360 95		
„ Mental Home, Saanich	66 25		
„ Colony Farm	511 10		
Sundry sales	59 79		
Produce supplied institutions	10,494 19		
Shrinkage and rot of potatoes	1,200 00		
		$16,360 59	
Inventory, March 31, 1922—			
Nursery stock, etc.	$40,134 50		
Vegetables in storage	4,129 75		
		44,264 25	
			$60,624 84

Expenses.

Salaries and upkeep	$ 2,980 23		
Board of employees	666 00		
Horse-labour, etc.	2,972 35		
Sundries	22 95		
		$ 6,641 53	
Carried forward		$ 6,641 53	$60,624 84

TRUCK-GARDEN AND NURSERY—*Continued.*

PROFIT AND LOSS ACCOUNT—*Continued.*

Expenses—Continued.

Brought forward		$ 6,641 53	$60,624 84
Crops from farm to nursery for distribution—			
Potatoes, 411,800 lb.	$ 4,529 80		
Onions, 2,350 lb.	170 62		
		4,700 42	
Inventory, March 31, 1921—			
Nursery stock, etc.	$39,203 60		
Vegetables in storage	8,207 85		
		47,411 45	
			58,753 40
Profit			$ 1,871 44

CROP DEPARTMENT.

POTATOES—PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1922.

Production.

By yield of crop, 1,026,500 lb.		$11,264 72

Expenses.

To Manuring	$ 760 50	
Ploughing	633 55	
Seed	995 85	
Fertilizer	1,417 42	
Disking	424 60	
Cultivating	460 00	
Digging	228 25	
Hauling	449 00	
Clearing field	17 00	
		5,386 17
Profit		$ 5,878 55

Field No. 3, 36.8 acres. Yield per acre, 13.94 tons; cost per ton, $10.49.

OATS—PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1922.

Production.

By Yield of oats, 140,000 lb. at $25 per ton	$1,750 00	
„ straw, 2,490 bales at 50 cents per bale	1,245 00	
„ green feed, 10,000 lb. at $5 per ton	25 00	
		$ 3,020 00

Expenses.

To Manure	$ 48 00	
Ploughing	565 90	
Seed-oats	243 70	
Seeding	98 90	
Packing	97 00	
Carried forward	$1,053 50	$ 3,020 00

CROP DEPARTMENT—*Continued.*

OATS—PROFIT AND LOSS ACCOUNT—*Continued.*

Expenses—Continued.

Brought forward	$1,053 50	$ 3,020 00
To Disking	430 25	
Cultivating	251 65	
Hauling oats	402 00	
Hauling straw	72 50	
Baling straw	278 00	
Sundries	320 62	
		2,808 52
Profit		$ 211 48

Field No. 1, 25.25 acres; Field No. 2, 28 acres; Field No. 5, 20 acres; Wilson Ranch, 9 acres; total, 82.25 acres. Yield of oats per acre, 1,702 lb.; cost per ton, $21.97.

HAY—PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1922.

Production.

By Yield of hay, 409,000 lb.	$3,067 50	
„ green feed, 69,500 lb.	173 75	
„ silage, 266,000 lb.	665 00	
		$ 3,906 25

Expenses.

To Seed	$1,290 45	
Manure	82 00	
Harrowing	42 00	
Mowing and raking	437 50	
Hauling	471 50	
		2,323 45
Profit		$ 1,582 70

Fields Nos. 6 and 7, 42.4 acres; Field No. 8, 37.5 acres; Wilson Ranch, 21.16 acres; total, 101.06 acres. Yield of hay per acre, 2.02 tons; cost per ton, $7.26.

ENSILAGE—PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1922.

Production.

By Peas, oats, and vetches, 598,000 lb. at $5 per ton	$1,495 00	
Green oats, 235,000 lb. at $5 per ton	587 50	
Corn, 222,000 lb. at $5 per ton	555 00	
Sunflower, 50,000 lb. at $5 per ton	125 00	
		$ 2,762 50

Expenses.

To Manure	$ 322 50	
Clearing field	82 20	
Ploughing	434 95	
Disking	345 50	
Seed	334 10	
Seeding	102 60	
Packing	119 25	
Cultivating	213 00	
Carried forward	$1,954 10	$ 2,762 50

CROP DEPARTMENT—*Continued.*

ENSILAGE—PROFIT AND LOSS ACCOUNT—*Continued.*

Expenses—Continued.

Brought forward	$1,954 10	$ 2,762 50
To Cutting	147 10	
Hauling	338 75	
		2,439 95
Profit		$ 322 55

Fields Nos. 3 and 8, 2.5 acres sunflower; Fields Nos. 5, 6, and 7, 33.35 acres peas, oats, and vetches; Field No. 3, 13 acres corn; Wilson Ranch, 12.6 acres green oats; total, 61.45 acres. Yield per acre, 8.99 tons; cost per ton, $4.41.

ONIONS—PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1922.

Production.

By Yield, 5,500 lb.		$ 220 00

Expenses.

To Ploughing	$ 26 00	
Disking	24 00	
Manure	47 50	
Seed	14 00	
Cultivating	27 50	
Fertilizer	32 00	
Hauling	3 50	
		174 50
Profit		$ 45 50

Field No. 3, 2 acres. Yield per acre, 2,750 lb.; cost per ton, $63.45.

CARROTS—PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1922.

Production.

By Yield, 80,800 lb.		$ 291 50

Expenses.

To Ploughing	$ 28 60	
Disking	31 20	
Manure	52 00	
Seed	7 20	
Fertilizer	28 00	
Cultivating	20 50	
Hauling	34 00	
		201 50
Profit		$ 90 00

Field No. 3, 2.6 acres. Yield per acre, 15.54 tons; cost per ton, $4.98.

TURNIPS AND MANGELS—PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1922.

Production.

By Yield, 430,780 lb.		$ 1,507 72
Carried forward		$ 1,507 72

CROP DEPARTMENT—*Continued.*

TURNIPS AND MANGELS—PROFIT AND LOSS ACCOUNT—*Continued.*

Brought forward		$ 1,507 72
Expenses.		
To Manure	$ 300 00	
Seed	46 40	
Disking	183 50	
Ploughing	282 40	
Fertilizer	171 80	
Rolling	30 50	
Cultivating	157 25	
Hauling	245 75	
		1,417 60
Profit		$ 90 12

Field No. 8, 12.6 acres mangels; Field No. 8, 8 acres turnips; total, 20.6 acres. Yield per acre, 10.45 tons; cost per ton, $6.58.

PASTURAGE ACCOUNT.

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1922.

Receipts.

By General herd		$ 578 00
Young cattle		173 00
Young horses		42 00
Sheep		201 25
Profit		$ 994 25

SHRINKAGE AND ROT.

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1922.

By Roots, 369,268 lb.		$ 1,853 32
Onions, 4,740 lb.		58 27
Potatoes		3,662 28
Beans, 1,075 lb.		107 50
Peas, 2,000 lb.		100 00
Loss		$ 5,781 37

TRACTOR ACCOUNT.

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1922.

Receipts.

By 614½ hours' work at $2.50		$ 1,536 25
Carried forward		$ 1,536 25

TRACTOR ACCOUNT—*Continued.*

PROFIT AND LOSS ACCOUNT—*Continued.*

Brought forward			$ 1,536 25
Expenses.			
To Depreciation		$ 550 00	
Operating Account—			
Salaries	$317 50		
Board	135 00		
Gasolene and oil	478 58		
Repairs	409 20		
		1,340 28	
			1,890 28
Loss			$ 354 03

PRIZE-MONEY ACCOUNT.

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1922.

Receipts.	
American Holstein Friesian Association	$ 70 00
Exchange on Holstein Friesian Association	7 87
Canadian Holstein Friesian Association	140 00
Credited to Dairy Profit and Loss Account	$ 217 87

EXHIBITION EXPENSES.

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1922.

Expenses.	
Freight	$ 54 00
Employees' transportation, board, etc.	389 70
Sundries	8 50
Loss	$ 452 20

GENERAL EXPENSES OF MAINTENANCE AND ADMINISTRATION.

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1922.

Expenses.	
To Salaries and vouchers	$19,791 15
Horse-labour	1,832 50
Milk, etc., to employees	724 01
Board, etc., to employees	2,395 50
Coal	1,492 63
Uniforms	140 00
Sundries	163 45
Loss	$26,539 24

MISCELLANEOUS STATEMENTS, INVENTORIES, ETC.

ESSONDALE INSTITUTION—PRODUCE SUPPLIED BY COLONY FARM.

Supply Account, March 31st, 1922.

Dairy produce—		
Milk, 343,316.2 lb.	$15,912 37	
Butter, 1,878 lb.	1,220 68	
Milk for employees, 52,920 lb.	2,454 19	
Cream for employees, 456 lb.	136 78	
Buttermilk, 80 lb.	1 60	
		$19,725 62
Meats—		
Beef, 9,625 lb.	$ 999 86	
Pork, 25,758 lb.	4,020 90	
Lamb and mutton, 2,469 lb.	367 86	
Veal, 1,480 lb.	245 62	
		5,634 24
Poultry—		
Eggs, $6,187 dozen	$ 2,142 22	
Dressed poultry, 2,333 lb.	930 74	
Feathers	10 50	
		3,083 46
Vegetables, etc.—		
Roots, 3,850 lb.	$ 15 05	
Potatoes, 184,425 lb.	2,030 32	
Onions, 4,420 lb.	163 50	
Fruit, vegetables, etc.	9,114 22	
		11,323 09
Sundries—		
Horse-labour, 2,248 hours	$ 1,124 00	
Straw, 70 bales	31 68	
Gasolene, 235 gallons	76 89	
		1,232 57
Total		$40,998 98

NEW WESTMINSTER INSTITUTION—PRODUCE SUPPLIED BY COLONY FARM.

Supply Account, March 31st, 1922.

Dairy produce—		
Milk, 174,033 lb.	$ 8,059 77	
Cream, 122,875 lb.	368 60	
Buttermilk, 1,040 lb.	20 80	
		$ 8,449 17
Meats—		
Veal, 627 lb.	$ 94 05	
Pork, 11,224 lb.	1,893 04	
		1,987 09
Eggs, 20 dozen setting		20 00
Vegetables, etc.—		
Onions, 2,100 lb.	$ 70 25	
Potatoes, 238,495 lb.	2,639 19	
Roots, 26,500 lb.	92 75	
Fruits and vegetables	1,142 93	
		3,945 12
Carried forward		$14,401 38

MISCELLANEOUS STATEMENTS, INVENTORIES, ETC.—*Continued.*

NEW WESTMINSTER INSTITUTION—*Continued.*

Supply Account—Continued.

Brought forward		$14,401 38
Incidentals—		
Straw, 12 bales	$ 8 40	
Horse-labour, 6,659 hours	3,329 50	
		3,337 90
Total		$17,739 28

SAANICH INSTITUTION—PRODUCE SUPPLIED BY COLONY FARM.

Supply Account, March 31st, 1922.

1 brood sow	$ 125 00
Cow, "Colony Poetess Korndyke"	300 00
Cow, "Yvonne Cornucopia Segis"	250 00
Plants, etc.	66 25
Mare, "Colony Jean"	250 00
Cow, "Bunty," and freight	131 00
Total	$ 1,122 25

BOYS' INDUSTRIAL SCHOOL—PRODUCE SUPPLIED BY COLONY FARM.

Supply Account, March 31st, 1922.

Milk, 15,366 lb.	$ 614 64
Cream, 85 lb.	25 49
Carrots, 1 ton	20 00
Total	$ 660 13

ACCOUNTS RECEIVABLE, MARCH 31ST, 1922.

D. C. McGregor	$ 48 75
W. Picton	110 00
C. Holmes	20 00
A. M. Craig	25 00
R. Kelly	80 00
Royal Columbian Hospital	488 60
C. S. McKee	60 00
Total	$ 832 35

NOTES RECEIVABLE, MARCH 31ST, 1922.

A. E. Smith	$ 500 00
C. H. Evans	200 00
J. M. Steves	100 00
Total	$ 800 00

REMITTANCE TO TREASURY, MARCH 31ST, 1922.

Sundry amounts received for sale of live stock and produce	$ 4,245 35

MISCELLANEOUS STATEMENTS, INVENTORIES, ETC.—*Continued.*

TREES, SHRUBS, AND PLANTS SUPPLIED TO PUBLIC SCHOOLS AND INSTITUTIONS, MARCH 31ST, 1922.

Enderby School	$ 41 00
Government Agent, Kamloops	9 00
Corporation of Coquitlam	114 40
Marpole School	308 80
Girls' Industrial School	231 20
Queen Mary School	87 00
Lord Kitchener School	80 00
General Currie School	80 10
Mr. Black	42 70
Alexandra Orphanage	108 30
Courtenay School	70 00
Duncan School	189 60
Chemainus School	61 80
Nanaimo School	93 60
Mission City School	38 00
University of British Columbia	805 45
Total	$ 2,360 95

EQUIPMENT, MARCH 31ST, 1922.

Summary.

Fire equipment	$ 1,106 50
Blacksmith-shop	534 00
Carpenter-shop	355 50
Dairy	2,008 50
Pumping plant, etc.	11,222 00
Farm supplements	4,467 00
Equipment in horse-barn	912 00
Equipment, wagons, carriages, etc.	1,864 00
Equipment in cow-barns	285 00
Nursery equipment	795 75
Poultry equipment	231 00
Total	$23,781 25

INVENTORY OF COWS, MARCH 31ST, 1922.

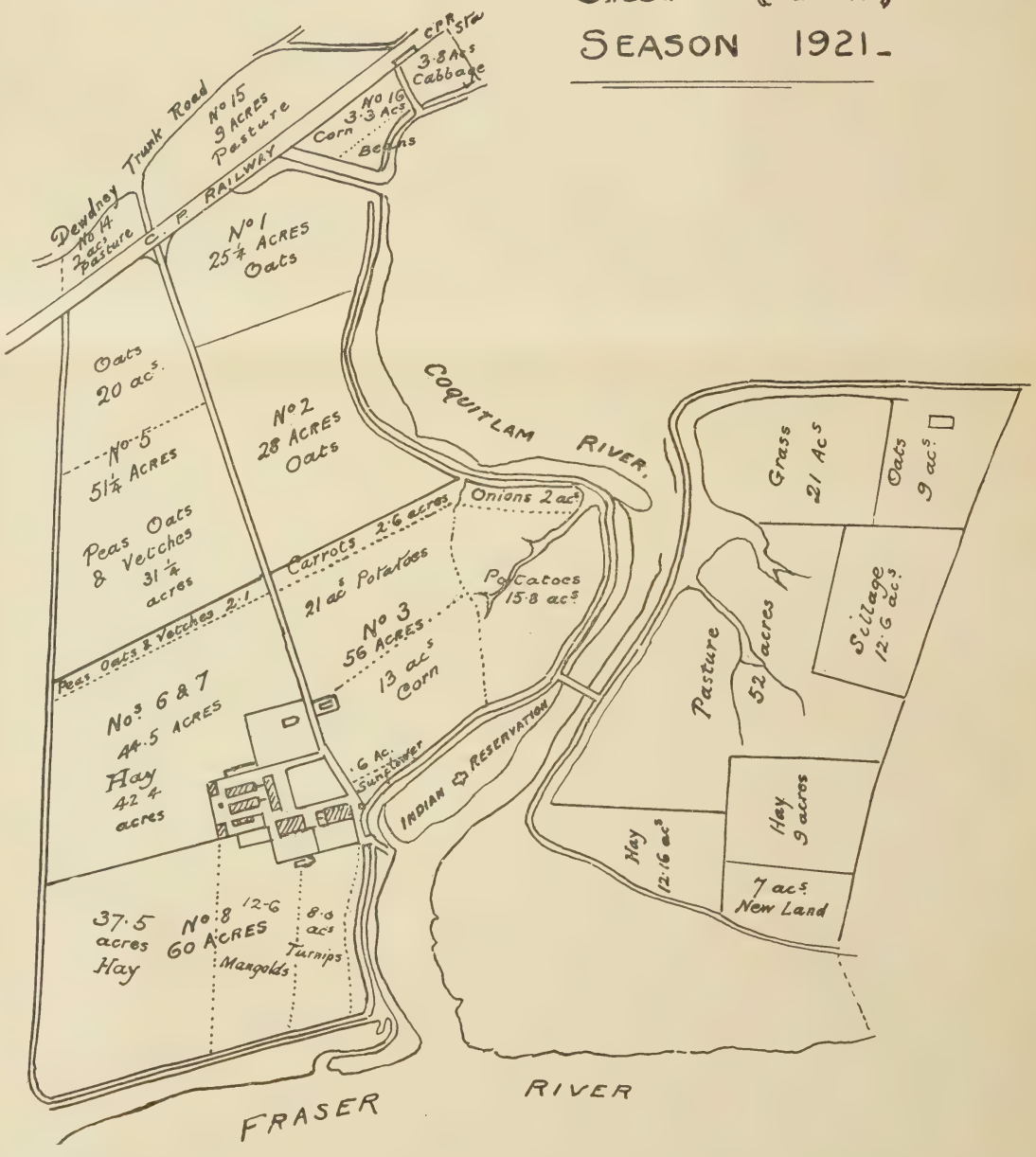
Name.	Reg. No.	
Ena Netherland DeKol 2nd	14666	$ 10 00
Colony Beulah DeKol Korndyke	26314	200 00
Colony DeKol Queenie Rag	26320	200 00
Colony Fayne Canary	30128	200 00
Colony Beulah Pauline Korndyke	30131	350 00
Colony Sadie Canary	30137	400 00
Colony Maud Colantha	32360	400 00
Colony Georgie Korndyke	32361	200 00
Morag Veeman DeKol	31643	400 00
Deirdre Douglass Segis	31842	550 00
Colony Poetess Korndyke 2nd	36012	350 00
Colony Contest Segis	36020	350 00
Colony Aaggie Pietertje	31774	200 00
Carried forward		$ 3,810 00

37·5
acres
Hay
No 8
60 ACRES
12-6
Mangolds
8·6
acs
Turnips
New Land
FRASER
RIVER
9/28/22
Stud.
Eg

PLAN of FIELDS

Provincial Government Colony Farm.
District Lots 305, 170, 60 & 25 N.W.D.
Municipality of Coquitlam.

CROPS RAISED, SEASON 1921.



9/28/22

MISCELLANEOUS STATEMENTS, INVENTORIES, ETC.—*Continued.*

INVENTORY OF COWS, MARCH 31ST, 1922—*Continued.*

Brought forward		$ 3,810 00
Name.	Reg. No.	
Colony Koba Segis	38770	150 00
Colony Cora Cornucopia	36008	300 00
Colony Poetess Segis	38771	350 00
Colony Beets Newman	38776	200 00
Colony Vrouka Segis	36019	350 00
Effie Cornucopia DeKol	37289	275 00
Colony Ena Butter Girl	41644	500 00
Colony Korndyke Belle	38767	450 00
Colony Butter Lass	41645	300 00
Colony Queenie Rag Segis	41652	250 00
Colony Ianthe Newman	41642	500 00
Colony Netherland Segis Clothilde	42889	350 00
Colony Minnie Segis	41653	300 00
Colony Faforit McKinley	42884	200 00
Lulu Posch 3rd	210921	450 00
Colony Korndyke Newman	50284	500 00
Colony Canary Butter Girl	42888	250 00
Wimple Netherland Westport	76901	350 00
Colony Bessie McKinley	52831	350 00
Colony Faforit Segis	52829	200 00
Colony McKinley Beulah	52828	600 00
Segis Elsie Posch	44320	150 00
Madam Bessie Posch	25833	400 00
Colony Clothilde DeKol	38772	300 00
Colony Maud McKinley	50286	500 00
Colony Canary McKinley	50292	300 00
Colony Wayne McKinley	50289	300 00
Colony Beulah McKinley	52833	600 00
Colony Grebegga DeKol	54084	600 00
Colony Daisy McKinley	52834	250 00
Colony Segis McKinley	52835	500 00
Colony Ena McKinley	56864	350 00
Colony Rag Valdessa	56868	250 00
Colony Poetess Valdessa	56862	300 00
Colony Ena DeKol McKinley	60946	800 00
Colony Maud Newman	60944	400 00
Colony Ianthe McKinley	62389	450 00
Colony Faforit Newman	67855	400 00
Colony Sena Ormsby	71114	200 00
Colony Abbekerk Ormsby	70845	250 00
Beaverland Lady Pauline	74111	500 00
Beaverland Pietje Posch	74113	250 00
Thorndale Elsie Wayne	38480	400 00
S.C.P. Fayne Calamity	59662	350 00
S.C.M. Ella Mechthilde	50277	350 00
Colony Vale Korndyke Newman	63024	300 00
Colony Clothilde Newman	67850	300 00
Colony Cora McKinley	67856	500 00
Colony Lakeside Newman	67851	300 00
Colony Vrouka Newman	67853	350 00
Carried forward		$21,885 00

MISCELLANEOUS STATEMENTS, INVENTORIES, ETC.—*Continued.*

INVENTORY OF COWS, MARCH 31ST, 1922—*Continued.*

Brought forward		$21,885 00
Name.	Reg. No.	
Colony Lady Ormsby	71112	300 00
Colony Morag Ormsby	71115	300 00
Colony Fleta Newman	70850	250 00
Colony Marie Newman	71111	250 00
Colony Cyclone Ormsby	70844	350 00
Colony Beulah P. Newman	70848	5 00
Colony Fayne Ormsby	70843	300 00
Colony Jannek Ormsby	75673	250 00
Colony Zarilda Ormsby	80505	500 00
Colony Countess Ormsby	75670	300 00
Colony Faforit Ormsby	80511	400 00
Colony Aaggie Ormsby	80509	400 00
Colony Grebegga Valdessa	62388	1,000 00
Colony Jemima Newman	80513	337 07
Colony Vrouka Segis Newman	80504	326 65
Colony Tensen Newman	86417	200 00
Beaverland Pietje Pauline	81218	350 00
Beaverland Pretty Lady	74110	500 00
Beaverland Grace Posch	74108	400 00
Beaverland Canary Pauline	74109	350 00
Beaverland Julia Pauline	80649	300 00
Beaverland Grace Pauline	80647	300 00
Total		$29,553 72

INVENTORY OF YOUNG CATTLE, MARCH 31ST, 1922.

Name.	Reg. No.	
Colony M. Poetess McKinley, 26¼ months old	75674	$ 341 25
Colony Effie Ormsby, 25 months old	80514	325 00
Colony P.S. Segis, 24 months old	80507	312 00
Colony P.S. McKinley, 24 months old	80508	312 00
Colony Beets Perfection, 22½ months old	80510	292 50
Colony Wayne Perfection, 22¼ months old	80506	289 25
Colony Alma Korndyke Newman, 20 months old	86419	260 00
Colony Grebegga Pauline, 18½ months old	86416	240 50
Colony Victoria Pauline, 18¼ months old	76415	237 11
Colony Morag McKinley, 17¼ months old	86420	223 25
Colony Lady Pauline, 16½ months old	86418	213 50
Colony Mabel Newman, 16 months old	92130	207 00
Colony Clare McKinley, 14 months old	92132	181 00
Colony Aaggie Mack Pauline, 13¼ months old	92127	171 25
Colony Wimple McKinley, 12½ months old	92135	161 50
Colony Effie Pauline, 11¾ months old	92129	151 75
Colony Nellie Pauline, 11¾ months old	92128	151 75
Colony Poem Pauline, 11¾ months old	92131	151 75
Colony Wayne Newman, 11¾ months old	92136	151 75
Colony Topsy Pauline, 11¼ months old	92134	146 25
Colony Schuilling Pauline, 11¼ months old	92133	146 25
Colony Lass Pauline, 11 months old	92126	143 00
Carried forward		$ 4,809 61

MISCELLANEOUS STATEMENTS, INVENTORIES, ETC.—*Continued.*

INVENTORY OF YOUNG CATTLE, MARCH 31ST, 1922—*Continued.*

Brought forward		$ 4,809 61
Name.	Reg. No.	
Colony King Posch, 10¼ months old	49994	133 25
Colony Belle Newman, 9 months old	95247	117 00
Colony Clothilde Pauline, 9 months old	95254	117 00
Colony July Pauline, 8¾ months old	95255	113 75
Colony Daisy Newman, 8¾ months old	95244	113 75
Colony Queenie Newman, 8¼ months old	95249	107 25
Colony McKinley King Pontiac, 7¾ months old	.....	100 75
Colony McKinley Count (sold)	51288	
Colony Johan Posch, 7 months old	51420	91 00
Colony Georgie Pauline, 6¼ months old	95245	81 25
Colony Flood Countess, 5 months old	95250	65 00
Colony Duchess Pauline, 5 months old	95246	65 00
Colony Contest Newman, 4¾ months old	95248	61 75
Colony Grace Countess, 4½ months old	95251	58 50
Colony Pietje Countess, 4¼ months old	95252	55 25
Colony Canary Countess, 4 months old	95255	52 00
Colony Esther Newman, 3¾ months old	95256	48 75
Colony Fayne Pauline, 3¾ months old	95257	48 75
Colony Maud Countess, 3¼ months old	98959	42 25
Colony DeKol Posch, 3 months old	52627	39 00
Colony L.P. Countess, 2¾ months old	98958	35 75
Colony Posch Champion 2nd, 2¼ months old	52623	29 25
Colony Poetess Camille, 2½ months old	98955	32 50
Colony Yvonne Camille, 2½ months old	98956	32 50
Colony C.B. Westport, 2 months old	52626	26 00
Colony Sir Koningen Posch, 2 months old	52628	26 00
Colony Vrouka Posch, 1¼ months old	98957	16 25
Colony Posch Champion 3rd, 1¼ months old	52624	16 25
Colony Posch Champion 4th, ¾ month old	52625	9 75
Colony Posch Champion 5th, ½ month old	.....	6 50
Colony Vale Newman, ½ month old	.....	6 50
Colony Mechthilde Posch, 8 months old	51287	104 00
Total		$ 6,662 11

INVENTORY OF HERD BULLS, MARCH 31ST, 1922.

Name.	Reg. No.	
Colony Prince Posch Paul	16951	$ 200 00
Colony Koba McKinley	31520	400 00
Colony Lord Aaggie McKinley	30957	500 00
Colony Posch Champion	45866	400 00
Total		$ 1,500 00

INVENTORY OF WORK-HORSES, MARCH 31ST, 1922.

Name.	
Donald (roan gelding), 16 years old	$ 200 00
Colony Pride (Scotty), 8 years old	300 00
Billy (McCallum), 6 years old	275 00
Carried forward	$ 775 00

MISCELLANEOUS STATEMENTS, INVENTORIES, ETC.—*Continued.*

INVENTORY OF WORK-HORSES—*Continued.*

Brought forward	$ 775 00

Name.	
Barney (bay gelding), 6 years old	300 00
Jock (bay gelding), 7 years old	300 00
Forage Heroine (Shire mare), 13 years old	300 00
Bramhope Emerald (Shire mare), 15 years old	275 00
Dunrobin Doris (Clyde mare), 15 years old	200 00
Pete or Sharp (gelding), 14 years old	125 00
Sandy (gelding), 15 years old	100 00
Colony Mintmaster (gelding), 4 years old	300 00
McCallum (chestnut driver), 16 years old	100 00
Jerry 2nd No. 6 (gelding), 8 years old	275 00
Levi (express), 18 years old	175 00
Repertoire (pony), 20 years old	50 00
Doctor (buckskin), on grade, 10 years old	150 00
Joe (bay gelding), 12 years old	200 00
Jimmy 1st (bay gelding), on grade, 9 years old	175 00
Kate (roan mare), 5 years old	275 00
Dan (brown gelding), on grade, 11 years old	150 00
Blossom (light roan mare), 5 years old	350 00
Nellie (bay mare), 9 years old	325 00
Dick (bay gelding), 4 years old	200 00
Colony Lady Pride, 3 years old	400 00
Colony Lady Dunure, 3 years old	400 00
Total	$ 5,900 00

INVENTORY OF YOUNG HORSES, MARCH 31ST, 1922.

Name.	
Colony Drumburle Prince, 23¾ months old	$ 542 80
Colony Begg Princess, 20¼ months old	462 81
Colony Opal's Queen, 20¼ months old	462 81
King (Driver's colt), 20¾ months old	474 13
Bob (Dunrobin Doris' colt), 10½ months old	239 92
Total	$ 2,182 47

INVENTORY OF STALLIONS, MARCH 31ST, 1922.

Name.	
Colony Everlasting Favourite	$ 500 00

INVENTORY OF SHEEP, MARCH 31ST, 1922.

Oxford Downs (pure-bred)—	
25 aged ewes at $17.50	$ 437 50
11 shearling ewes at $14	154 00
4 shearling rams at $25	100 00
3 2-year-old rams at $30	90 00
1 aged ram	75 00
Grade flock—	
42 aged ewes at $10	$ 420 00
19 shearling ewes at $10	190 00
4 shearling wethers at $7.50	30 00
Total	$ 1,496 50

MISCELLANEOUS STATEMENTS, INVENTORIES, ETC.—*Continued.*

INVENTORY OF POULTRY DEPARTMENT, MARCH 31ST, 1922.

399	Leghorn pullets at $2	$ 798 00
230	„ hens at $1.50	345 00
56	Rhode Island Red pullets at $2.50	140 00
40	„ „ hens at $1.50	60 00
12	cockerels at $2	24 00
80	baby chicks at 45 cents	36 00
261	„ at 30 cents	78 30
51	dozen eggs at 24 cents	12 24
	Total	$ 1,493 54

Feed, etc., on Hand.

500	lb. wheat	$ 9 50
210	„ chick-feed	8 15
100	„ cracked corn	1 50
200	„ grit	3 50
300	„ oyster-shell	5 25
100	„ bran	1 50
100	„ shorts	1 50
2	cases coal-oil	7 60
	Total	$ 38 50

INVENTORY OF HOGS, ESSONDALE, MARCH 31ST, 1922.

76	hogs, weight 12,226 lb. at 8 cents	$ 978 08

INVENTORY OF HOGS, NEW WESTMINSTER, MARCH 31ST, 1922.

20	hogs (fat), 1-year-old	$ 400 00
20	„ 10 months old	300 00
8	„ 7 months old	120 00
18	„ 6 months old	270 00
19	„ 3 months old	190 00
10	„ 4 weeks old	50 00
11	„ 3 weeks old	55 00
30	„ 2 weeks old	150 00
9	„ 1 week old	35 00
22	brood sows	990 00
2	boars, 1 and 2 years	100 00
	Total	$ 2,660 00

INVENTORY OF FEED AND PRODUCE, MARCH 31ST, 1922.

	Peas, 2,180 lb.	$ 109 00
	Oats, 121,500 lb.	1,915 26
	Barley, 2,000 lb.	30 00
	Hay, 166,960 lb.	1,306 16
	Silage, 486,000 lb.	1,215 00
	Straw, 2,679 bales	1,365 91
	Corn-meal, 11,240 lb.	181 76
	Shorts, 17,100 lb.	183 89
	Potatoes, 140,865 lb.	1,549 54
	Carried forward	$ 7,856 52

MISCELLANEOUS STATEMENTS, INVENTORIES, ETC.—*Continued.*

INVENTORY OF FEED AND PRODUCE—*Continued.*

Brought forward		$ 7,856 52
Gluten, 18,100 lb.		497 33
Cotton-seed meal, 4,500 lb.		95 80
Alfalfa, 41,130 lb.		423 74
Oil-meal, 4,600 lb.		138 07
Beet-pulp, 24,100 lb.		530 20
Bran, 10,560 lb.		121 16
Total		$ 9,662 82

INVENTORY OF NURSERY AND GARDEN, MARCH 31ST, 1922.

Deciduous ornamental trees		$11,996 65
Shrubs and small trees		7,205 40
Cuttings and layers		469 65
Seedlings		404 20
Climbing plants		333 00
Climbing roses		130 50
Reeds and grasses		358 50
Evergreen trees and shrubs		7,355 95
Young fruit-trees		56 50
Flowering cherries		10 00
Cratægus		18 00
Herbaceous perennials		1,586 85
Bulbs		141 00
Orchard—		
Plum-trees	$ 459 00	
Cherry-trees	240 00	
Pear-trees	502 00	
Apple-trees	2,408 00	
		3,609 00
Small fruits—		
Black currants	$3,398 00	
Red currants	648 00	
Raspberries, etc.	486 25	
Strawberries	1,400 80	
		5,933 05
Bees and supplies		526 25
		$40,134 50
Vegetables in storage		4,129 75
Total		$44,264 25

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1922.

PROVINCE OF BRITISH COLUMBIA

ANNUAL REPORT

OF

THE DEPARTMENT OF RAILWAYS

FOR THE

YEAR ENDING DECEMBER 31ST

1921

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1922.

To His Honour WALTER CAMERON NICHOL,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

I have the honour to present herewith the Annual Report of the operations and activities of the Railway Department of the Government of British Columbia for the year ending December 31st, 1921, with supplementary notes for 1922.

JOHN OLIVER,

Minister of Railways.

Victoria, B.C., September 30th, 1922.

REPORT OF DEPARTMENT OF RAILWAYS.

VICTORIA, B.C., September 30th, 1922.

Hon. John Oliver,
Minister of Railways, Victoria, B.C.

Sir,—I have the honour to submit a report dealing with the principal activities of the Railway Department during the year ending December 31st, 1921, with supplementary notes to September 30th, 1922.

The staff of the Railway Department consists of Chief Engineer, Assistant Engineer, Chief Inspector of Rolling-stock and Equipment, two Assistant Inspectors, clerk, and two stenographers.

In addition to railways, the Department has control over the Songhees terminal improvement-works and the maintenance and operation of the combined railway and highway bridge over the Fraser River at New Westminster, with its railway and highway approaches.

The details are set forth hereunder.

(1.) CANADIAN NATIONAL RAILWAY TERMINALS.

Construction of the above terminals has been continued throughout the year at Vancouver and Victoria, and estimates have been approved by the Department for payment in accordance with the provisions of section 7 of the "Canadian Northern Pacific Railway Terminals Act, 1917," from December, 1920, to December, 1921, inclusive, totalling $379,861.43.

Work on the Victoria terminals is still confined to the area north of Point Ellice Bridge, no construction-work having been done on the proposed car-transfer spur line (south of the bridge) referred to in last year's report.

The position of the terminals is as follows:—

Terminal.	Estimated Total Cost of each Terminal.	Proportion of Estimated Cost.	Total Cash available for each Terminal.	Proportion of Total Work now done.	Amount now earned.	Retentions.	Amount payable.
Vancouver	$4,308,455 10	0.4713	$4,262,363 21	0.9025	$3,846,782 61	$ 9,668 73	$3,837,113 88
New Westminster	2,202,601 50	0.24095	2,179,113 97	0.83633	1,822,458 41	83,507 69	1,738,950 72
Port Mann	1,213,424 62	0.13275	1,200,570 16	0.97881	1,175,129 92	.....	1,175,129 92
Steveston	353,988 89	0.0387	349,996 73	0.8197	286,892 54	.....	286,892 54
Patricia Bay	209,908 29	0.0230	208,008 39	0.9846	204,804 68	.....	204,804 68
Victoria	853,125 00	0.0933	843,790 66	0.4822	406,875 54	250 00	406,625 54
Dec. 31st, 1921, totals	$9,141,503 40	1.000	$9,043,843 12	.....	$7,742,943 70	$93,426 42	$7,649,517 28
Aug.-Dec. 31st, 1922, totals.	$9,141,503 40	1.000	$9,043,843 12	.....	$7,850,511 30	$96,209 03	$7,754,302 27

(2.) CANADIAN NATIONAL RAILWAY CONSTRUCTION.

(*a.*) *Vancouver Island, Mile 0–Mile 100.*—No further construction-work has been carried out on this section, the head of steel being at Mile 74, south end of Cowichan Lake.

(*b.*) *Kamloops–Kelowna Line.*—No track-laying, bridging, or additional grading has been done on this line during the year.

(3.) WESTMINSTER BRIDGE—RENEWALS AND REPAIRS.

Gates.—The contract awarded to Frew & Fraser for new automatic highway gates (with motors) on September, 1920, was completed during June, inaugurating a very marked improvement over the original system, under which forty seconds were required for raising or lowering, as against six seconds on the new installation.

Highway Floor.—Tenders for reflooring the entire highway deck across the steelwork of the bridge were called for in August and the contract finally awarded on September 14th, as follows: Vancouver Pile Driving and Contracting Company for flooring renewal (timber); Cotton Company, Limited, for asphaltic surface. Owing to severe weather conditions and the consequent closing-down of local sawmills, these contracts will not be completed until next spring, although the renewal of original timber flooring was 90 per cent. finished on December 31st. Owing to congestion of traffic caused by sharp turn at north highway approach it was decided to widen the floor-surface 6 feet. This was carried out by the erection of an 18-inch I beam, 38 feet long, supported on vertical steel channel posts bedded in concrete pedestals, all connected up

with original structure by a 12-inch I beam and steel bracing. In connection with widening of the highway approach the realignment of the 4-inch water-pipe and gate-valve became necessary. This was carried out by Spring & Sibley, whose work included installation of fire-protection standards, replacing original valve openings on bridge, removal of gate-valve 10 feet west, construction of a concrete box around same for frost protection, and connecting up with original pipe-line.

Swing-span Machinery.—An examination of the racer-rack, shoes, and wedges showed the necessity for immediate overhaul, and a contract was awarded to Webb & Gifford (lowest tenderers) for rebolting racer-rack, repairing shoes, resurfacing wedges, and supplying one spare wedge, all of which was completed without interfering with the operation of the swing-span. In addition to the above work, four chrome-steel rail-guides were renewed on this span.

East Spread Span—Rail Renewal.—This span connects with Great Northern Railway depot at north end of bridge and is laid out on a 14° curve, which causes very rapid rail deterioration. Thirty 80-lb. rails were renewed during the year, secured by double-ended tie-plates and bridle-rods, together with fifty-two new ties.

B.C.E.R. High Transmission Towers.—A careful inspection of the British Columbia Electric Railway transmission towers carrying power-lines across the bridge disclosed dangerous deformation in the vertical members of the south tower, which rises 165 feet above top of bridge pier, and after consulting with the British Columbia Electric Railway officials it was decided to remedy this condition by removing original cross-bracing and substituting an improved system carrying lighter members, thus reducing the excessive dead-load which was the cause of the original trouble. This work was commenced by the British Columbia Electric Railway Company towards end of the year and will not be completed until next year. Some changes will also be carried out in connection with north tower bracing.

Signals and Interlocking.—The extension of signal-protection on the east approach, towards Port Mann, has not progressed beyond the stage of negotiations with the Canadian National Railways and Great Northern Railway.

Painting.—The painting crew worked steadily from April to September, using the machine which gave most satisfactory service throughout the season, thus enabling the men to cover a much greater surface of steelwork than has previously been possible.

Traffic.—The railroad traffic across bridge for year was as follows:—

	PASSENGER.		FREIGHT.		MIXED.	
	Trains.	Cars.	Trains.	Cars.	Trains.	Cars.
Great Northern Railway	2,810	16,758	824	17,377	69	206
Canadian National Railway	1,452	10,137	1,531	25,450	1,368	6,202
British Columbia Electric Railway	3,315	8,630	1,184	12,024	961	2,419*
Canadian Pacific Railway†	....	....	....	1,884	....	....
Chicago, Milwaukee & St. Paul	....	....	....	636	....	....
Northern Pacific Railway	....	....	....	432	....	....
	7,577	35,525	3,539	57,803	2,398	8,827

* Dairy cars, 2,103.
† NOTE.—Sixteen C.P.R. passenger-trains composing 172 cars were routed across Westminster Bridge in October and December, owing to flood damage on Canadian Pacific Railway main-line system.

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Highway Floor.—The Vancouver Pile Driving and Contracting Company completed their reflooring contract in February, also reframing three timber bents on south highway approach where it connects with steel trusses.

The Cotton Company, Limited, commenced operation on the asphaltic concrete paving contract in March and completed the work by May 6th. In order to preserve the correct operating balance of the swing-span it was found necessary to reduce the weight of the asphaltic concrete pavement on this truss by using timber fillers covered with sheet asphalt wearing surface.

Swing-span Machinery.—The Heaps Engineering Company was awarded a contract for installation of two C.S. boxes designed to reinforce the lower end of main shaft which swings

this span and completed the work in April. Repairs to worm-gears, driving-arms, etc., were also carried out by this firm at the same time.

Pier-protection Crib.—On account of abnormally low water in the early winter months floating ice was carried below the upstream sheeting of the protection-crib at swing-span pier, damaging the nose-piling. Three new nose-piles were driven and the iron nose-plates extended down to extreme low-water mark by the Fraser River Pile Driving Company during April.

B.C.E.R. High Transmission Towers.—The work of straightening the south tower and the erection of the new system of bracing was completed by the British Columbia Electric Railway in June, after which work was commenced on the north tower and completed by August.

Signals and Interlocking.—Some trouble has been experienced in connection with existing re-entrance bonds along the track which have proved totally inadequate to take care of the return current in the rails when the British Columbia Electric Railway freight-trains are climbing the grade south of the bridge. Three new re-entrance bonds of the most modern type and enlarged capacity have been put in, and it is proposed to gradually replace all the old bonds with this improved type.

Retaining-wall along Front Street.—The log-crib retaining-wall which for the past eighteen years has supported the Government track and road-bed from the Great Northern Railway depot east along Front Street and along the Canadian Pacific Railway track, having reached its limits of safety, was condemned, and in May tenders were called for its replacement by a concrete structure. The contract was awarded to Robertson & Rendell, Limited, lowest bidders, in June, and work started the same month.

(4.) SONGHEES RESERVE.

Leases in Force in 1921.

Name.	Description.	Acreage.	Expiry Date.
Sidney Roofing & Paper Co.	Sub-lot 3 of Lot 119	2.92 acres, increased to 3.244 acres	April 14th, 1940.
B.C. Yacht & Boat Builders	Sub-lot 4 of Lot 119	1.27 acres, increased to 1.29 acres	June 30th, 1930.
C. Cholberg	.....	3.92 acres	Oct. 31st, 1921.
A. Berquist	.....	1.35 acres, increased to 5.4 acres	July 12th, 1922.
Amphlett & Howell	.....	0.35 acres	Monthly.

Johnson Street Extension.—Bids were called for the grading of this street, extending 2,404 feet from the western boundary of the former Songhees Reserve to the Esquimalt & Nanaimo Railway Bridge, two tenders only being received, as follows: The Corporation of the City of Victoria, $48,861.45; Pacific Construction Company, Limited, Admiral's Road, Esquimalt, $45,261.05.

On December 5th, 1921, the contract was awarded to the Pacific Construction Company, Limited, lowest tenderer, and work was commenced on December 8th; the value of work done on this contract up to December 31st being $625.

Applications for change of industrial spur track connecting with Esquimalt & Nanaimo Railway were received from the Sidney Roofing and Paper Company and Shell Oil Company (negotiating for adjoining lease) during December, and relocation survey was made, followed by work of moving track over, the cost being chargeable to leaseholders affected.

Supplementary to Foregoing, 1922.—The Pacific Construction Company finished its contract in September.

(5.) JOHNSON STREET BRIDGE.

The total contribution of the Provincial Government towards this undertaking is $200,000, of which $56,843.95 has been released to December 31st, 1921, and the following summary from reports of F. H. Allwood, Resident Engineer on construction, is submitted through courtesy of City Engineer Preston, under whose direction the work is being carried out:—

In December, 1920, the City Council authorized the Engineering Department to proceed with construction of the substructure of the highway portion of this bridge and a part of the substructure for the railway section. This was all comprised in what is known as Contract No. 1, and work was commenced during the first week in January, 1921.

The various units in this contract are as follows, starting from the easterly or city approach to the bridge: (1) East abutment; (2) counterweight trunnion pier; (3) main trunnion pier; (4) rest pier; (5) west abutment.

Of these, the east abutment, rest pier, and west abutment were all founded on rock and the counterweight trunnion pier and main trunnion pier on piles driven to rock.

Owing to the proximity of the present Esquimalt & Nanaimo Railway swing-bridge it was found impossible to construct the whole of the east abutment or main trunnion pier, so that portions of these were excluded from Contract No. 1.

Below is given a comparative list of the estimated cost and the actual cost of the various units to end of year 1921:—

Unit.	Estimated Cost.	Actual Cost.	Remarks.
East abutment	$ 13,706 00	$ 15,188 00	Completed.
Counterweight trunnion pier	64,314 00	60,158 00	,,
Main trunnion pier	43,906 00	38,022 00	,,
Rest pier	26,928 00	23,994 00	Not completed.
West abutment	31,795 00	24,376 00	Completed.
Erecting equipment, etc., to be segregated amongst above actual costs	.....	10,821 00	
Equipment, etc., to be segregated amongst above actual costs	.....	16,179 00	
	$180,649 00	$188,738 00	

Supplementary, 1922.—The total payments made by the Provincial Government on account of this work as at August 31st amount to $141,154.47.

(6.) EQUIPMENT INSPECTION.

The following report from Chief Inspector Rae indicates what has been accomplished under this heading:—

An increase of locomotives, mileage, and equipment is shown over the previous year and a great improvement made in bringing the equipment to conform to the standard safety-appliance regulations of this Department.

Although a number of logging-railways have not been operating for the year, however, the companies kept men employed repairing and standardizing their equipment, and also giving attention to the upkeep of their tracks and bridges with respect to standardization of switch-stands, guard-rails of bridges, switch and material clearances as required by the Department, and from the number of inquiries being made of this Department the year 1922 will see a number of these roads operating again, with more equipment added.

During the year 15 locomotives were given an internal inspection and 118 tested; 1 locomotive boiler was found dangerous. Number of accidents on locomotives, 2; number of locomotive designs for boilers, 8 (2 from local companies and 6 submitted from outside of the Province); 9 second-hand locomotives were brought into the Province and 2 new ones; designs for locomotive appurtenances submitted for approval were 6. Inspections made on entire equipment of railways for Workmen's Compensation Board total 39; engineers examined, 50; certificates issued, 42. There are at present 9 railways operating with gas-propelled motors as a motive power, and from the inquiries made by different companies, and also on account of the advancement being made on this gas-propelled car, it will be necessary for this Department to adopt certain regulations to govern this type of equipment to secure safety in its operation.

As this is the third year this Department has taken over this work of standardization of railways, a large amount of educational work has been carried on. At the latter part of this year a large amount of time was devoted to the British Columbia Electric Railway system in assisting to bring about the right-hand operation of their equipment and railway, and more time will have to be given to this work next year.

There are now under the jurisdiction of this Department 89 industrial and common-carrier railways, with a total equipment of: Locomotives, 180; gas-locomotives, 12; other equipment, 4,229; and a total mileage of 1,075.

Electric railways have the following mileage: British Columbia Electric Railway, 367.64 on all divisions, with a total rolling-stock equipment of 928; Nelson Street Railway, 4 miles; total rolling-stock equipment, 3; which shows an increase on industrial railways over the previous year of 120 miles, 18 steam-locomotives, 596 other equipment, and 12 gas-cars.

There have only been three accidents with fatal results for this year.

The inspection-work carried on by the Inspectors of the Department necessitated in a great many cases extra visits to some of the railways. This was done for the purpose of assisting in bringing their equipment and locomotive boilers up to the standardization required by this Department.

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Hydrostatic tests applied to boilers from January 1st, 1922, to September 15th, 1922	121
Internal inspections of boilers	32
Engineers examined	36
Engineers' certificates issued	26
Number of locomotives inspected other than hydrostatic tests	36
Inspections made on entire equipment and railroads for the Workmen's Compensation Board	26
Number of cars inspected on logging and mining railroads	1,781
Number of miles of track inspected on logging and mining railroads	389
Accidents investigated on logging and mining railroads	4
Fatal accidents on logging and mining railroads	5
Accidents investigated on British Columbia Electric Railway	6
Fatal accidents on British Columbia Electric Railway	5
Number of locomotive-boiler designs approved	1
Number of designs for locomotive appurtenances approved	9

The above does not include any inspections of equipment or railroad on the British Columbia Electric Railway.

With reference to the British Columbia Electric Railway: The conversion of its cars and change in tracks to permit right-hand operation were completed early in the year and the change over was a complete success. No serious accidents of any kind occurred which could be attributed to this change.

All the railways operating under the jurisdiction of this Department are endeavouring to comply with the rules and regulations of this Department and of the Compensation Board.

(7.) PACIFIC GREAT EASTERN RAILWAY.

(*a.*) NORTH SHORE DIVISION—MAINTENANCE.

During the last week in October severe floods were experienced, accompanied by wash-outs, which tied up most of the railway systems out of Vancouver. The west abutment of the Pacific Great Eastern Bridge over Capilano River was undermined at the down-stream end and rock-filling emptied out. This was immediately checked by rushing out an extra crew under Section Foreman Miller, who deposited brush and wire mattressing inside the abutment and refilled with boulders. There is no doubt that this abutment would have collapsed had not prompt action been taken to check erosion, as this was the maximum flood experienced since the construction of the railway. The bridge and piers withstood successfully the impact of logs, roots, and detritus, which were carried down with terrific force by the flood, and this is doubtless due to protection-work which has been carried out in previous years. A large jam formed on the centre pier, which was removed by blasting and cutting, as were collections of roots and trees left piled up on the gravel-bar above bridge after the high water subsided. Traffic was not interfered with in any way on this section of the line by the flood.

The City of North Vancouver made application in August for a spur track along Chesterfield Avenue, between wharf and Esplanade, for car-barge transfer service, with a diamond level crossing over the Pacific Great Eastern Railway track, which was approved by Order in Council dated October 4th and construction work started in November.

Supplementary, 1922.—From Lonsdale Avenue terminal to Bewicke Avenue, a distance of 3,640 feet, the Pacific Great Eastern track is carried along the foreshore on a standard pile trestle, the easterly section of which had been steadily deteriorating from attack of marine borers, which are very destructive in this locality. As a permanent improvement it was decided to train-fill the trestle from Lonsdale Depot to Mahon Avenue at east boundary of Mission Indian Reserve, a distance of 1,630 feet, which work was carried out by the Operating Department in February, and a round timber subway constructed beneath fill at west end of Lonsdale Station platform for industrial purposes.

The westerly 2,010 feet of this trestle between Mahon and Bewicke (across Mission Indian Reserve) shows no signs of damage to piling from toredo activity, which is probably accounted for by the fresh water discharging into the sea from creeks along this stretch of foreshore.

The municipal spur track, diamond crossing, and wye on Chesterfield Avenue, connecting wharf with house track on Esplanade, was opened for traffic in April under contract between North Vancouver City Council and Captain Yorke, who operates a car-barge connecting with Great Northern Railway wharf terminal, Vancouver.

(*b.*) SQUAMISH TO QUESNEL—MAINTENANCE.

G. T. Livingstone, Resident Engineer, reports as follows:—

The engineering services rendered may be divided into three classes—those undertaken at the request of your office, those requested by the Operating Department, and those of a routine nature in connection with ordinary maintenance. In the majority of cases those of the last two classes, unless they were unusual or involved capital expenditure, were not reported upon to your office.

During the year locations and plans were made for the Jordon lease and for the Gustafson lease at Mons; for the Ogle lease at Exeter; for the Fraser lease at Clinton; for a proposed new spur to the Newport Sawmill; and for a booming-ground for the same mill on the foreshore just west of the Squamish Dock approach.

Locations were made for a flag-station at Simpson Lodge, Mile 91.6; for the cattle-pens moved from Tatton to Exeter; for Nielands logging-spur at Mile 35.4; for Birch's logging-spur at Owl Creek, Mile 64.5; for Squarebriggs & MacDonald's logging-spur at Mile 71.45; for the Nakamoto logging-spur at Mile 69.8; and for the revision of the Atma Ram-Nakamoto logging-spur at Mile 68.8. All the foregoing locations, except that at Exeter, are on the Squamish Subdivision. Of the above spurs, that of Squarebriggs & MacDonald has not as yet been constructed.

Surveys and plans were made in connection with the water rights for the Brackendale tank, Mile 6.1, Squamish Subdivision; the Kelly L. tank, Mile 33.94, Lillooet Subdivision; the Lone Butte tank, Mile 88.37, Lillooet Subdivision; the Lac la Hache tank, Mile 117.65, Lillooet Subdivision; for the Williams Lake tank, Mile 156.0, Lillooet Subdivision; and for the Williams Lake Townsite tank and water-supply. All the papers in connection with applying for water licences were made in connection with the foregoing tanks, except the Kelly Lake and Brackendale tanks, where further information only, in connection with existing licences, was required by the Water Rights Branch. Surveys and plans were also made in connection with the proposed new spur at the Newport Mills and with the section-house location and proposed increase of station-grounds at Lone Butte.

Reports and estimates were made on the proposed team-track at Williams Lake; the fencing of 3 miles of track through the Indian reserve at Pavilion; the fencing of the west side of track at Mile 80½ to Mile 82; the dredging required at Squamish Dock and Ferry-slip; the repairs to the original Cheekye Bridge; the repairs to the flumes and siphons on the Fountain Indian Reserve No. 3; and the proposed crossover from the scale-tracks to the roundhouse at Squamish.

Plans and estimates were made on the proposed extension and remodelling of the company eating-house at D'Arcy. Plans and a report for a threatened lawsuit over the killing of a pig at Mile 82.27 and a cow at Mile 84.29, on the Squamish Subdivision, were also made.

The installation of the logging-road jump crossing at Mile 30.4, McGuire, the salvaging and re-erecting of the oil pipe-line at Squamish Dock, and the repairs to the dock itself were supervised. In connection with the last-mentioned work my attention was required almost continuously from June 6th to October 25th.

From November 1st to date my time and attention have been entirely taken by the repairs to road-bed and bridges damaged during the floods of late October. During this time I have had the assistance of a transit-man and two chainmen.

Besides a number of trips by train, many trips of inspection, aggregating some thousands of miles, have been made by speeder during the year, at which time the more important bridges, points of danger, the actions of floods, and the track and road-bed in general have been examined and such action taken or remedy applied as the situation seemed to warrant.

Upkeep and Betterments to Road-bed.

Up to October 22nd the amount of main-line mileage under operation was 278. On that date an additional 70 miles, Williams Lake to Quesnel, was taken over for operation, making a total of 348 miles. Of this amount, the first 154½ miles out of Squamish is mountainous, with the usual difficulties of maintenance common to that class of country, while the remaining 193½ miles is up through a plateau and valley country presenting no unusual problems of upkeep, outside of two or three short stretches of muskeg between Lac la Hache and Williams Lake, a few wet and sliding cuts north of the latter place, and the section of moving ground, over which the road passes, just south of Quesnel.

There are twenty-six sections between Squamish and Quesnel, the average length of sections being about 13½ miles, with variations both ways of 3 miles. During the past working season, that is from the middle of May to the first of November, the average number of trackmen per section was one foreman and three labourers. In the latter part of May an extra gang averaging about sixteen men was put on between Squamish and Chasm and was laid off at the end of the first week of November. This gave an average of about 3 miles of track per man, including foremen in the mountain district and about 4 miles per man over the remainder of the road. During the winter months the average number of men per section varies from a foreman and one man to a foreman and two men, with the following present exceptions: Squamish, foreman and four men; Marne, foreman and four men; Quesnel, foreman and eight men.

In spite of the excessive mileage per man and the short season worked, commendable results were obtained in the way of upkeep and betterments. Besides the usual work of track patrol, etc., considerable work was done in the way of clearing and burning brush on the right-of-way, fighting forest fires, and gauging, lining, and surfacing the track. During the year some 55,000 ties were put under, the result being a great improvement in track conditions. On various sections the gangs did a small amount of ballasting, in most cases bringing the material on push-cars from near-by cuts. A number of sections, notably Marne, Shallath, McKinnon, Pavilion, and Lough Raymond, and Mons and Pemberton in a lesser degree, were troubled by slides, cleared in most instances by the section-gang, and in some instances by the gang with the assistance of either, or both, the extra gang or the ditcher.

We have on hand at present 51,500 ties, and of these 50,000 should be put under during the coming year. Records of the past two years indicate that in all probability we will not be able to handle more than that quantity unless special provision for doing so is made. Considerable work remains to be done in the spring in connection with road-bed repairs, necessitated by the damage caused by the October flood, and should any funds be available after same is completed it could be spent to better advantage in track betterments other than tie renewals beyond the quantity mentioned above. The Roadmasters are asking for 78,000 tie renewals during the coming year.

If finances permit, it would be advisable to increase the length of the working season by starting April 1st; to increase the size of a number of section-gangs by one or two men; to increase the extra gang; and to operate the ditcher to a greater extent than during the past season. The need of ballast at many points and the lifting of track at the approach to numerous bridges should also be considered.

Upkeep of Buildings and Structures, other than Bridges.

The following work on buildings and structures, other than bridges, was done by the B. and B. gangs during the year. B. & B. Gang No. 1 was composed of an average of eight men throughout the year and attended principally to the upkeep of bridges, although an appreciable amount of their time was taken up in assisting with the repairs to Squamish Dock and later in the year in rendering splendid service helping to open the line after the October

floods. B. and B. Gang No. 2 was composed of four men from June 18th to October 31st. This gang did much of the work mentioned above and also looked after the upkeep of a number of bridges where either the work or the isolated location of the bridge did not warrant the use of the larger gang. B. and B. Gang No. 3 was composed of five men and was employed princpially in wrecking and salvaging the Squamish Dock. This gang was also used to assist in opening the line. The three gangs were under the direction of B. and B. Master Dillon.

Repaired the roof of the dock warehouse; repaired and painted the roof of the oil-storage tank at Squamish; roofed and painted extra-gang outfit cars; repaired the roofs of the B. and B. outfit cars; repaired and made alterations to the eating-house at East Lillooet, including the installation of a sink and drain-board and a number of structural changes; repaired, by replacing, a broken pipe at the East Lillooet water-tank; repaired the end of the roundhouse at the same place; repaired and extended station platform at Clinton; repaired and made alterations to the stations at Clinton and Lillooet; repaired the roof of the warehouse; repaired and made alterations to the shop store; raised the warehouse and built loading-platform along same; repaired and tightened the water-tank (all at Williams Lake); repaired roof of freight-shed at Pemberton; repaired fence and gates at Squamish Docks; repaired sidewalk between office and station at Squamish, and many small jobs of repairing at various points on the line, particularly at Squamish in connection with the company dwelling-houses and other buildings.

Built on or put in a number of shelves and drawers, refitted seventeen doors and nineteen windows, and repaired eight locks in company dwelling-houses; built railing, cupboard, shelving, drawers, door, and coal-bin and repaired gutters at company office, Squamish; built ten bunks, lined office-car, steamed out cars, and painted interiors of same with two coats (all for B. and B. No. 1); built bunks, tables, benches, and shelves in outfit-car of B. and B. No. 2, and made table, benches, shelves, and meat-safe for the ditcher cook-car; built sheds over the two winches at the ferry-slip; built a new standard-plan warehouse at Pemberton; built 100 feet of stairway to the pump-house at Williams Lake and made and hung two new gates at the stockyards at the same place; put in two new gates, posts, and wings at the stockyards at Mamquam and braced a number of electric-light poles on the Squamish Dock approach; put in new freight door and rehung old doors at the dock warehouse.

The station at Pavilion was moved to a new location and a new foundation and platform built. Two pens of the stockyards at Lough Raymond were taken down, moved, and rebuilt at Clinton, at which point the station and freight-shed were moved back to standard distance and a new warehouse was built. Supervised dismantling of stockyards at Tatton and the rebuilding of same at Exeter. Jacked up Squamish section-house and repaired foundations. Took down all doors, casings, frames, trims, windows, benches, scales, V-joint interior finish, and loaded same in car, at Squamish Dock, after that structure was wrecked by floods in October; at same point took down two-thirds of the warehouse, dismantled wrecked portion of the dock, and loaded all material worth saving on to cars. Also salvaged baggage-trucks, oil-pipe line, castings, and fittings of same, and salvaged and boomed ninety-eight good-order piles. Removed, with aid of logging-donkey, the large drift and log-jam lodged by the flood along the ferry-slip from the mooring-dolphins to the main line switch.

In addition to the foregoing, a considerable amount of other work, difficult to classify, was done. Mention of the principal items, however, will be found under other headings, such as bridges, damage to road-bed and structures, cribbing, etc.

Upkeep of Bridges.

An extensive programme had been planned for the B. and B. gang for the past year. Unfortunately it was impossible to complete in full the work laid out, for reasons outside of the control of the B. and B. Master.

On June 6th eighty piles were scoured out from under the Squamish Dock, and the B. and B. gang was called in to clear the wreckage, take up the deck, and in general prepare for the pile-driver from Vancouver which had been engaged. On June 20th, while work was in progress, another large number of piles went out, including some just driven, although penetration to over 40 feet had been obtained. On July 20th 140 piles went out, there having been driven to that date 183 piles, and only three piles remaining to complete the job. The front portion of the dock was then cut off, a part of which was salvaged, in the hope of getting away from the edge of the bar and the scouring action of the river. The work of driving was completed on

August 20th, and the B. & B. gang finished the redecking and bracing about a week later. No further trouble occurred until October 20th, on which date the dock was so badly wrecked that it was useless. The damage occurred on each occasion on a very low tide with the river in high flood. It is hopeless to try to maintain this dock in its present location unless the Squamish River is diverted to the old west channel.

On each of the above occasions the B. and B. gang was called in as the pile-driving outfit had neither sufficient men nor tools to cope with the situation. After the floods in late October the B. and B. gangs were again called in to assist the N.C. Co. in the work of repairs to the line between Squamish and Pemberton. On these and a number of minor occasions over two months were lost in so far as getting on with the mapped-out programme was concerned.

All bridges between Squamish and Bridge 58.0, across the Lillooet River at Pemberton, were gone over and tightened and such renewals and repairs as were found necessary made. These included the entire redecking, as well as some new posts and caps, of Bridges 4.8 and 5.4; the driving of forty-eight piles and other renewals at Cheekye Bridge; the renewal of thirteen pile footings at Bridge 15.4; and the driving of odd piles and changing of posts here and there at other bridges.

Between the Lillooet River Crossing and the town of Lillooet some immediately necessary work was done on the following bridges: 65.3, 69.6, 79.1, 82.4, 84.7, and 118.1. None of the remaining bridges on that part of the road were gone over during the year. They were, however, the last ones to be put in shape a year ago, and the B. and B. are now about to start in on these bridges, working south from Lillooet.

Work on the renewal of the footings under the Fraser River Bridge has been undertaken, but interrupted on several occasions. To date twenty-three of the forty-three bents in the north approach have had the pile-bent footings replaced by framed pony-bents on mud-blocks. This work will be carried on as the opportunity presents until completed. Besides this work all loose bolts in the approaches and deck were tightened and the north truss was tightened and the truss-rods adjusted.

Between East Lillooet and Pavilion all bridges were gone over. This work included some heavy pile-footing renewals, the total number being 430; the greatest numbers put in one bridge being 143 in Bridge 13.7 and 122 in Bridge 14.4.

Of the bridges between Pavilion and Kelly Lake, only Bridges 20.3, 26.0, and 27.3 had work done on them during the year; they, with those north to Williams Lake, having been put in shape in the fall of 1920.

The bridges between Kelly Lake and the second south of Clinton were also found to be in fair condition. From there to Chasm the bridges were gone over and seventy-one new pile footings put in. Sixteen more are yet to go in.

Between Chasm and Williams Lake Bridges 72.0 and 140.0 were gone over. The remaining bridges in that district needing attention soon are Bridges 74.5 and 155.28.

The bridges between Williams Lake and Quesnel are all practically new structures and were tightened and attended to shortly prior to being turned over for operation. Some of these, especially in the north, are on bad ground and need attention, being out of line and surface.

During the year every pile footing between Squamish and Chasm was tested by boring, the test being made from a foot to a foot and a half below the ground surface. Beyond Chasm it was not found necessary to test all piles as they are comparatively new.

Besides the work indicated above, the B. and B. did a large amount of other work, as maintained elsewhere. Had it not been for the two months spent by B. and B. gangs Nos. 1 and 2 on entirely unexpected work, there is no question that they would have covered all bridges between Squamish and Williams Lake as intended. On account of the lost time and the additional bridges to look after on the Williams Lake Subdivision it will be necessary to maintain B. and B. Gang No. 2 throughout the year.

Bridges between Squamish and Lillooet—Squamish Subdivision.

Bridge 0.0.—Squamish Dock. Pile-bents. Badly damaged by piles scouring out three times during the past summer. Repaired by driving 266 piles ranging in length from 60 to 90 feet, with penetration running from 20 to 45 feet. Original size of dock was: Length, east side, 183 feet; west side, 243 feet. At time of final damage front of dock cut off, 20 feet being taken off the east length and the west length cut back to within 15 feet of the pier shed. Size of shed,

57 by 108 feet; width of dock, including loading-track and bunker, 112 feet. Work finished at end of August. Dock completely wrecked by scouring on October 22nd, since which time two-thirds of same has been pulled down and material worth saving has been salvaged. Now out of commission.

Bridge 0.15.—Loading-track, Squamish Dock. Pile-bent trestle spur off dock approach. Original length, 735 feet. Outer end back to point opposite centre of pier shed wrecked same time as dock and now out of commission. Coal-cars can be placed to that point. Engines should not pass inshore face of dock. Height, 20–30 feet (about 3 feet above high tide); number of spans 49. Braces on Bents Nos. 7 and 21 broken and one pile in Bent No. 41 split. Piles are of good size, tested, and found to be sound. Caps showing age. Good for some time yet. Has been lined and shimmed. Bolts are tight. Other than as noted, bridge is in fair shape.

Bridge 0.2.—Ferry-slip at Squamish Dock. Pile-bent trestle with apron and towers at outer end. Is a spur off dock approach. Length, 1,020 feet, and apron; number of spans, 66; height, 20–25 feet (about 6 feet above high tide). Not damaged by floods. Out of line and surface at some points. Same general remarks apply here in regard to piles as in Bridge 0.15. Was shimmed and lined once during year, but needs same again. One new pile needed. Towers are in fair shape and same applies to the two protecting towers. Two old mooring-dolphins still in place on west side. New dolphin driven on east side this year. All O.K. Slip is of poor design and difficult and dangerous to operate. Considerable trouble keeping slip free of logs, trees, and other drift brought down by the river. Caps showing signs of age. Bridge is tight and in general in fair shape.

Bridge 0.3.—Approach to Squamish Dock. Pile-bent trestle, 3,275 feet long; height 5–30 feet (about 6 feet above high tide); number of spans, 218. Has been shimmed and lined during year, but out in respect to both now. Loading-track joins at Bent No. 47 and the ferry-slip at Bent No. 52. Many of the piles show some rot above high-water line, but not to serious extent, except in two instances, where new piles are needed. Replaced eighteen broken ties and seven caps during year. Caps show signs of age. All caps on this and two preceding structures will have to be replaced during the next two years. Other timbers on this and preceding structures O.K. Bridge is tight and in general in fair shape. Alignment on this and two preceding bridges is tangent and curve. No check-rails on any of them.

NOTE.—The term "in fair shape" as used above is somewhat misleading and is used only after taking into consideration the conditions at those points. These bridges are operated at all times under slow orders, but, as bridges, are more or less in poor condition. They cannot be maintained in proper condition until the Middle Branch of the Squamish River is turned into the old west channel.

Bridge 0.97.—Old Howe Sound & Northern trestle; now filled in and no longer considered as a bridge. Length, 240 feet.

Bridge.—Newport Sawmills spur at Mile 1. Pile-bent trestle, consisting of log-dumping track and spur loading-track off main spur. All put in first-class repair eighteen months ago. Not used for six months. Engines do not go beyond loading-track head-block. Length of main spur trestle, 635 feet (last 60 feet damaged by fire that destroyed mill); length of loading-track trestle, 270 feet. Height of former, 12 feet; of latter, 6 feet. Number of bents in former, 43; in latter, 18. Bridge is tight and timbers, braces, piles, and other features O.K. for the purpose for which bridge is used. Waterway, mill-pond, O.K.

Bridge.—Stuart Lake Shingle-mill spur, opposite Mile 1.15. Framed-bent trestle on mud-blocks. Length, 135 feet; height, 6 feet; standard P.G.E. construction, except ties and guard-rails. Waterway, mill-pond, O.K. Number of spans, 9. Outside footing of Bent No. 5 washed out and bridge settled at that point. Mill is shut down. Spur has not been operated for over a year. Prohibition put on this bridge, to remain until repaired. Other features O.K.

Bridge 2.5.—Pile-bent trestle across slough between Squamish and Mamquam Rivers. Length, 585 feet; number of spans, 39; height, 17 feet. Waterway, tidal, O.K.; width, 450 feet at high tide. Piles, barked fir, 14–17 inches, with up to 2¼ inches of rot in those on dry land; those in water sound. All timbers, ties, braces, etc., O.K. Bridge tightened, lined, and shimmed during the year. Alignment (tangent) good; surface good. Track off south end fair; off north end low. Bridge in general in good condition.

Bridge 3.6.—Pile-bent trestle over drainage-slough. Length, 45 feet; height, 15 feet; number of spans, 3. Alignment (curve) O.K. Surface fair. No check-rails or flanger-signs. Piles, 14–

16 inches; some sound; others have 1¾ to 2¼ inches of rot. All bolts and spikes tightened this year. Track on and off, low. Other features O.K. Bridge in general in good condition.

Bridge 4.15.—New pile-bent trestle constructed in December. Length, 75 feet; height, 13 feet; number of spans, 4 (one being 30 feet). All bents, except bulk-heads, sheeted up on both sides. Watercourse, flood-waters from the Mamquam River, 45 feet wide. Needs heavy riprapping. Piles, 11–12 inches, O.K. Ties, timbers and other features, O.K. Bridge is tight. Some work yet to be done, such as guard-rails, etc. No check-rails nor flanger-signs. Alignment (tangent) and surface good. Track on and off, fair.

Bridge 4.2.—Pile-bent trestle over stream 2 feet wide (12 feet wide in flood). Length, 60 feet; height, 15 feet; number of spans, 4. Waterway subject to scour and needs more riprap. Piles, 14–18 inches. Most are sound; others have rot up to 2¼ inches; O.K. Bents Nos. 2 and 3 have had original ground surface scoured away to a depth of 4 feet. Some rot in ends of stringers caused by dirt against right side, south end, and left side, north end. Rot in two or three ties; not serious. Bridge tightened this year. Other ties, timbers, braces, etc., in good condition. Alignment (tangent) and surface good. No check-rails nor flanger-signs. Other features O.K., except track, on and off, is low.

Bridge 4.3.—Pile-bent trestle over dry watercourse (during floods subject to violent flow from the Mamquam River). Length, 30 feet; height, 8 feet; number of spans, 2. Piles, 14–16 inches, with up to 2 inches of rot; O.K. Middle bent has had earth scoured away to depth of 4 feet. More riprap needed. This stream could be blocked off by fill on old main line at gravel-pit spur and by 60 feet crib on the Mamquam. All timbers, braces, ties, etc., sound and O.K. Bridge has been gone over and tightened this year. Alignment (tangent) fair and surface good. Track on and off, low. No check-rails. Other features O.K. Bridge in general in good condition.

Bridge 4.6.—Pile-bent trestle. Waterway, 6 feet wide, drainage-creek; O.K. Piles, 14–16 inches, with up to 2 inches of rot; O.K. Length, 30 feet; number of spans, 2; height, 6 feet above water. Piles in water all sound. Bridge has been gone over and tightened this year. Timbers, braces, ties, etc., sound and O.K. Alignment (tangent) and surface O.K. Track on and off, low. No check-rails nor flanger-signs. Other features O.K. Bridge in general in good condition.

Bridge 4.8.—Rebuilt framed-bent trestle on pile footings in water. Three new posts put in each bent and three old caps replaced. Entire new standard deck. Work done this year. Bulk-head bents originally pile-bents, now replaced with new caps and M.B. Piles, 14–16 inches, all sound. Alignment (tangent) good and surface O.K. No check-rails. Other features O.K. Track on and off, slightly low. Bridge in general now O.K. Length, 45 feet; spans, 3.7 feet high.

Bridge 5.4.—Rebuilt framed-bent trestle on pile footings in water. Waterway, slow-moving stream 16 feet wide and 3 feet deep, which runs lengthwise of the bridge for 180 feet; O.K. Length, 195 feet; number of spans, 13; height, 10 feet above water. Rebuilt this year in identical manner to Bridge 4.8. Five new caps put on. Alignment (tangent) and surface good. Track on and off, low. Piles all large and sound. No flanger-signs. Bridge in general now O.K.

Bridge 9.7.—Originally six 30-foot spans on rock-filled log cribs, which were reinforced last spring by two sheated-in pile-bents, with new bridge-seats, at each pier. Three south spans and 130 feet of road-bed at south end washed out by October flood. Now being rebuilt and repaired by 125-foot through Howe truss and temporary pile-bent approach, to be filled later, at south end. New bridge when completed will have, besides the truss span, one new 30-foot approach span at south and three original 30-foot approach spans at north end. Length will be 245 feet; number of spans, 5; height, 15 feet. Last three spans and footings at north end O.K., but need riprap. North bulkhead needs reinforcement to fill and protection. Stream to be diverted to more or less its old location. Riprap at south approach will be needed and three, or possibly four, river-protection cribs will have to be built. Piers for new truss are of piles enclosed in 12- by 12-inch square timbers, protected by wire-woven rock and brush mats. Work now under way without hold-up to traffic. Alignment (spiral and tangent) and surface will be O.K. Track on and off, low. Waterway, Cheekye River, a mountain stream subject to violent floods. Width, 30 feet. (160 feet in flood). Considerable drift above bridge to be bucked up.

Bridge 9.8.—Pile-bent trestle over dry waterway. Length, 45 feet; height, 15 feet; number of spans, 3. Piles, barked cedar and fir of good size, have rot up to 1½ inches; O.K. Two new bulk-head caps put in and bridge tightened this year. Timbers, ties, braces, etc., O.K. Alignment (tangent) good and surface fair. Track on and off, low. No check-rails. Other features O.K. Bridge generally O.K.

Bridge 11.6.—Pile-bent trestle across Tenderfoot Creek. Length, 45 feet; number of spans, 3; height, 12 feet. Waterway, creek 10 feet wide, O.K. Riprap O.K. Piles, 12–14 inches; those in south bulk-head have rot to 1½ inches; those in water and north bulk-head are sound. Both bulk-head bents properly shimmed and whole bridge gone over and tightened during the year. Timbers, ties, and braces, O.K. Alignment (spiral) and surface good. No tie-plates nor check-rails. No flanger-sign at north end. Track on and off, low. Other features O.K.

Bridge 13.0.—Pile-bent trestle over wet swale. Length, 60 feet; height, 9 feet; number of spans, 4. Piles, 12–14 inches, with rot from 1 to 2 inches; O.K. Rot in end of stringers at south bulk-head and in one at north bulk-head. Has been taken care of by putting in auxiliary caps. Cap of Bent No. 2 has been renewed. Whole bridge lined, tightened, and shimmed this year. Ties (16 inches on centres), timbers, and braces now O.K. Alignment (spiral) and surface good. No tie-plates nor check-rails. Track on and off, low. Other features O.K.

Bridge 15.4.—Across Swift Creek Canyon. Deck Howe truss, 100 feet long, with sixteen trestle approach spans at south end and thirteen trestle approach spans at north end. Total length, 535 feet; number of spans, 30. Highest approach bent at south, 2½ stories; at north, 1⅓ stories. Height of rail above water, approximately 80 feet. North approach composed of framed bents on M.B. South approach composed as follows: First four are pile-bents, next five are framed bents on pile footings, and last eight are framed bents on M.B. M.B. are O.K. Piles, 12–14 inches; some had rot up to 3½ inches and one was completely gone. Thirteen new pile and mud-block footings put in this year to replace rotted piles. All timbers, ties, braces, posts, sills, caps, etc., in approaches and truss O.K. Whole bridge gone over this year and tightened throughout and truss-rods adjusted. Compression members O.K. Some bottom chord-joints slightly open. Castings, gib-plates, clamps, keys, etc., O.K. Lateral connections O.K. Line and camber good. A number of new braces put on this year. Alignment (curve) and surface good. Other features O.K.

Bridge.—Two 30-foot spans with log approaches across Swift Creek and other log structures on Day's logging-spur have been dismantled during the year and the spur taken up.

Bridge 17.3.—Framed trestle on M.B. Length, 405 feet; number of spans, 26; height, up to 2½ stories. All spans are 15 feet, except one of 30 feet over the old wagon-road. Waterway, small creek through culvert, O.K. Timbers, ties, braces, guard-rails, etc., O.K. Bridge has been gone over this year and lined, shimmed, and tightened. Alignment (tangent and curve) and surface good. Track on and off, low. Other features O.K. Bridge in general in good condition.

Bridge 17.6.—Framed trestle on M.B. M.B.'s are hewed fir and cedar and are O.K. Length, 345 feet; number of spans, 23; height, up to 2 stories. No waterway (dry gulch). Bridge gone over this year and lined, shimmed, and tightened. All ties, timbers, braces, etc., O.K. Alignment (tangent and curve) and surface good. Track off north end, low; off south end, fair. Other features O.K.

Bridge 17.83.—Framed trestle on M.B., which are O.K. At south portal of tunnel No. 2. No waterway (rock gulch). Length, 165 feet; height, 40 feet; number of spans, 11. Has been damaged at various times by falling rock from overhanging lava-flow. Some timbers, ties, etc., more or less surface-damaged on account of same. Bent No. 2 has been blocked and shimmed on account of same and sluffing of rock under footings. Should be watched. Would be better to take out Bent No. 2 and put 30-foot span between Bents Nos. 1 and 3. Bridge gone over this year and tightened. Alignment (curve) and surface good. Ties, timbers, braces, etc., O.K. Track on and off, low. Other features O.K.

Bridge 17.9.—Framed trestle on M.B. across rock gulch between Tunnels Nos. 2 and 3. M.B., O.K. Length, 45 feet; number of spans, 3; height, 15 feet. Bridge has been gone over and tightened this year. Ties, timbers, braces, etc., O.K. No waterway. Alignment (tangent) and surface good. Track on and off, good. Other features O.K. Bridge in general is in good condition.

Bridge 18.0.—Framed bent trestle on M.B., which are O.K. Across rock gulch at north portal of Tunnel No. 3. No waterway. Length, 225 feet; number of spans, 15; height, up to 2 stories. Bridge has been gone over this year and two new sway-braces and one diagonal put on; also lined, shimmed, and tightened. Ties, timbers, braces, etc., O.K. Alignment (tangent) and surface good. South end partially filled in with rock from tunnel cave-in two years ago. Track on and off, fair. Other features O.K. Bridge in general in good condition.

Bridge 18.1.—Framed trestle on M.B. over rock gulch and rock-slide. M.B. are O.K. Length, 615 feet; height, up to 3 stories; number of spans, 41. Waterway, none. Near centre footings are on rock-fill supported by log cribs, which are showing age, but still apparently safe. This portion of the bridge was knocked out by a large rock-slide a number of years ago. Still danger from a recurrence of same. On January 1st, 1920, 135 feet of the south end of this bridge was destroyed by a rock-fall from outside the right-of-way. Still occasional rocks coming down, now and again causing damage to odd posts and braces. Constant watch kept. All trains under orders to approach this bridge prepared to stop. Bridge has been gone over during the year and shimmed and tightened, and one new post, five new diagonals, two girts, and one sway-brace were put in. Alignment (curve) and surface good. Track on and off, a little low. Many of footings buried in rock-slide. Ties, timbers, braces, etc., O.K. Other features O.K. Bridge in general in good condition.

Bridge 18.2.—Deck Howe truss, 60 feet, with framed six-bent trestle approach spans at the south end and one framed-bent trestle approach spans at the north end; all on M.B., which are O.K. Across rock gulch. No waterway. Length over all 170 feet; height of approaches, up to 1 story; number of spans, 8. Bridge has been gone over this year and tightened throughout, including truss and adjusting of tension members of same. Footings, posts, sills, caps, stringers, ties, timbers, braces, and bridge-seats, O.K. Tension members good. Braces and counters O.K. Upper and lower chords, floor-beams, and laterals, O.K. Castings, gib-plates, etc., and all compression members, O.K. Line and camber good. Other features O.K. Track on and off, fair. Alignment (tangent) and surface good. Bridge is in good shape.

Bridge 18.3.—Framed-bent trestle on M.B. across rock gulch. No waterway. M.B. are O.K. Length, 150 feet; height, up to 2 stories; number of spans, 10. Bridge has been gone over this year. Was tightened and had a number of anchor-bolts changed. Posts, sills, caps, ties, stringers, braces, etc., O.K. Alignment and surface good. Track on and off, low. Other features O.K. Bridge is O.K.

Bridge 18.4.—Framed-bent trestle on M.B. across rock gulch. No waterway. M.B. are O.K. Length, 240 feet; height, up to 1 story and cripple. Bridge gone over this year and tightened. Two new diagonals put in. Timbers, ties, braces, etc., O.K. Line and surface good. Track off north end, good; off south end, low. Other features O.K. Bridge in general is in good condition.

Bridge 19.1.—Deck Howe truss, 130 feet, with nine framed-bent trestle approach spans at south end on M.B. and five framed-bent trestle approach spans at north end. This bridge entirely destroyed by forest fire two years ago. Present structure built new at that time. M.B. are O.K. Towers are framed, the one at the north being about 6 feet high and resting on rock shelf and that on the south is 2 stories high and supported on rock-filled timber abutment resting on concrete base. Highest approach bent (on south) is 3 stories. Length over all, 340 feet; number of spans, 15. Waterway, Cheakamus River, near upper end of canyon. Riprap and bench-walls O.K. All ties, timbers, caps, sills, braces, etc., in approaches and truss O.K. Alignment (curve, spiral, tangent, and spiral) and surface good. Whole bridge has been gone over this year and tightened and truss-rods adjusted. Upper and lower chords O.K. and joints tight. Lateral systems O.K. Tension members and compression members O.K. Castings, gib-plates, clamps, keys, etc., O.K. Other features O.K. Track on and off, fair. Bridge is O.K.

Bridge 21.5.—Combined framed-and pile-bent trestle across stream. Length, 60 feet; height, 12 feet; number of spans 3, including one of 30 feet. Waterway needs riprap at upper side, south end of bridge, where bank is subject to scour. Piles, 11–14 inches, and M.B. are O.K. Bridge gone over this year and tightened. Timbers, ties, braces, etc., O.K. Alignment (tangent) and surface fair. Track on and off, fair. Other features O.K. Bridge is in good condition.

Bridge 21.7.—Pile-bent trestle over mountain-stream. Length, 60 feet; height, 12 feet; number of spans, 4. Was damaged, but now repaired by thirteen new piles, one set of posts, and M.B. a little over a year ago. Bridge has been gone over this year and tightened, shimmed, and had more new mud-blocks put in. Waterway is O.K. Piles are 12–16 inches and O.K. Alignment (tangent) and surface good. Track on and off, fair. Other features O.K. Bridge in good condition.

Bridge 24.1.—Deck Howe truss, 100 feet, with two trestle approach spans, framed on M.B., and three trestle approach spans, framed on M.B. at north, across Cypress Creek. Waterway, large stream, O.K. Length over all, 180 feet; number of spans, 6; height, about 40 feet above water. Bridge has been gone over this year and tightened, including the adjustment of truss-

rods. Guard-rails, ties, stringers, floor-beams, caps, posts, sills, braces, other timbers, and M.B. are O.K. Bottom chords O.K. Compression members and laterals O.K. Castings, gib-plates, clamps, keys, etc., O.K. Tension members O.K. Bearings O.K. Line and camber good. Water-barrels, check-rails, flanger-signs, etc., O.K. Bench and wing-walls O.K. Alignment (curve) and surface good. Track on and off, low. Other features O.K. Bridge is O.K.

Bridge 25.2.—Pile-bent trestle across small slough stream at water-tank. Waterway O.K. Length, 30 feet; height, about 5 feet. Was originally two spans of 15 feet, then four spans of 7½ feet. Was badly blocked and shimmed. Has been gone over during the year, and repaired about eighteen months ago by driving thirteen new piles and replacing three caps. Now tight and in good order. Piles are O.K. Ties, timbers, etc., are O.K. No check-rails or sign-boards. Alignment (tangent) and surface good. Track on and off, low. Other features O.K.

Bridge 26.6.—Framed trestle on M.B. and pile footings across low ground. Waterway, small brook, O.K. Length, 405 feet; height, up to 1½ stories full; number of spans, 27. Fourteen bents on M.B. and same number on pile footings. M.B. are O.K. Piles, 11–16 inches, with rot up to 1 inch; O.K. Bridge gone over during the year and tightened and shimmed and one new post and several new M.B. put in. Ties, timbers, braces, etc., O.K. Alignment (curve) fair and surface good. Track on and off, fair. Other features O.K. Bridge is in good shape.

Bridge 27.0.—Framed trestle on M.B. across Olive Creek. Length, 315 feet; height, up to 2 full stories; number of spans, 20, including one 30-foot skew supported on double-bent towers, which stand on rock-filled square timber cribs. M.B. and cribs are O.K. Waterway, large stream, subject to floods, O.K. Bridge has been gone over this year and shimmed and tightened. Ties, timbers, braces, etc., O.K. Alignment (curve) and surface good. Track on and off, fair. Bench and wing-walls O.K. Other features O.K. Bridge is in good condition.

Bridge 28.2.—Deck Howe truss, 60 feet, with three framed trestle approach spans at each end, all on M.B. Length over all, 150 feet; height, about 60 feet above water. Across top of Brandywine Falls on river of same name. Framed towers on sills and cribs O.K. Footings O.K. Bridge has been gone over this year and tightened throughout, including adjusting the truss-rods; also shimmed where needed. Ties, caps, sills, posts, stringers, braces, timbers, etc., in both truss and approaches, O.K. Chords, compression members, laterals, tension members, etc., O.K. Castings, gib-plates, etc., O.K. Floor-beams, bearings, etc., O.K. Line and camber good. Bench and wing-walls O.K. Alignment (tangent) and surface good. Track on and off, low. Other features O.K. Bridge is in good shape.

Bridge 30.5.—Through Howe truss, 125 feet, without approach spans. Length, 125 feet; height, 15 feet; number of spans, 1. Waterway, North Fork of the Cheakamus River 80 feet wide, O.K. Pile towers O.K. All timbers throughout, including seats, O.K. Bottom chords O.K. Some bottom chord-joints open. Floor system O.K. Bridge has been gone over this year and tightened, including the adjustment of truss-rods. Tension and compression members O.K. Laterals O.K. Castings, gib-plates, clamps, keys, etc., O.K. Line and camber O.K. Alignment (tangent) and surface good. Track on and off, low. Other features O.K.

Bridge 32.5.—Framed-bent trestle across dry gulch, all on M.B., except eight centre bents, which are on 12 to 16-inch cedar pile footings. Piles have rot up to 1¼ inches; O.K. M.B. are O.K. Length, 300 feet; height, up to 2 stories and pile-bent cripple; number of spans, 20. A number of bents in south half have 2-inch shims on the M.B., apparently original construction. Bridge has been gone over this year and tightened throughout. Ties, timbers, braces, etc., O.K. Paving and riprap O.K. Alignment (tangent) and surface fair. Other features O.K. Track on and off, slightly low. Bridge is in good shape.

Bridge 33.75.—Pile-bent trestle across stream. Length, 60 feet; height, 9 feet; number of spans, 4. Piles, 12–14 inches O.K. Both bulk-heads are on M.B. and O.K. Waterway, creek (30 feet wide in flood), O.K. Riprap O.K. Bridge was gone over this year and tightened, one new cap put in, and both bulk-heads shimmed. Ties, timbers, braces, etc., O.K. Track on and off, low. Alignment (tangent) and surface good. Other features O.K. Bridge is in good condition.

Bridge 33.8.—Pile-bent trestle across Miller Creek. South bulk-head is on M.B., which are O.K. Length, 120 feet; height, 7 feet; number of spans, 8. Piles are in water and O.K., except north bulk-head, where they have rot to ½ inch; also O.K. Bridge gone over this year. Tightened and shimmed. Alignment (tangent) and surface good. Ties, timbers, braces, etc., O.K. Track on and off, low. Other features, including waterway, large stream, and riprap, O.K. Bridge is O.K.

Bridge 34.3.—Pile-bent trestle across Miller Creek. Length, 150 feet; height, 8 feet above water; number of spans, 10. Waterway, stream (20 feet wide and 5 feet deep when in flood), and riprap O.K. Piles, 13–15 inches; those in water sound; those in bulk-heads have rot to 1 inch; O.K. Bridge was gone over this year and tightened. Ties, timbers, braces, etc., O.K. Alignment (tangent) and surface good. Track off south end good; off north end, low. Other features O.K. Bridge in general is in good condition.

Bridge 35.4.—New bridge, built in December this year, over small creek subject to heavy flood. Length, 15 feet; height, 10 feet; number of spans, 1. On M.B. and sills on rock-filled log cribs with wings. Waterway, small creek, and riprap O.K. Guard-rails yet to go on. Ties and timbers new and O.K. Alignment (tangent) and surface good. Track on and off, a little low.

Bridge 38.1.—Pile-bent trestle across large slow stream at Rainbow Lodge. Length, 75 feet; height, 7 feet; number of spans, 5. Waterway, 35 feet, stream to Alta Lake, O.K. Piles, 13–16 inches, have rot in bulk-head bents to ½ inch; those in water sound; O.K. Bridge was gone over this year and tightened and a number of guard-rail and anchor-bolts replaced. Ties, timbers, braces, etc., O.K. Alignment (curve) and surface good. Track on and off, low. Bridge is O.K.

Bridge 38.5.—Pile-bent trestle across dead slough. Length, 30 feet; height, 7 feet; number of spans, 2. Waterway O.K. Piles, 13–15 inches, have got rot in bulk-head bents to 1 inch (one pile to 3 inches); those in water sound; O.K. Has been gone over this year and repairs similar to Bridge 38.4 were effected. Ties, timbers, etc., O.K. Alignment (tangent) and surface good. Track on and off, low. Other features O.K. Bridge in general in good condition.

Bridge 38.6.—Pile-bent trestle over dead-water slough. Length, 120 feet; height, 4 feet; number of spans, 8. Bridge gone over this year and rotten caps and piles of bulk-head bents replaced by new caps and M.B. Piles in water, 13–18 inches, sound. Bridge tightened. Ties, timbers, etc., O.K. Alignment (tangent) good. Surface good. Track on and off, low. Other features O.K.

Bridge 38.8.—Pile-bent trestle across dead-water slough. Length, 75 feet; height, 5 feet above water; number of spans, 5. Piles, 12–15 inches, O.K. Waterway O.K. Bridge has been gone over this year and tightened. Ties, timbers, etc., O.K. Alignment (tangent) and surface good. Other features O.K. Bridge is O.K. Track on and off, low.

Bridge 38.9.—Pile-bent trestle across outflow from Alta Lake to Green Lake. Length, 90 feet; height, 5 feet above water; number of spans, 6, Waterway, stream 75 feet wide, O.K. Piles, 11–15 inches, with ½ to 1 inch of rot in bulk-head bents, O.K. Bridge has been gone over this year and tightened. Ties, timbers, etc., O.K. Alignment (tangent) and surface good. Track on and off, low. Other features O.K.

Bridge 39.7.—Pile-bent trestle over swale. Length, 60 feet; height, 5 feet; number of spans, 4. Piles, 13–16 inches, with ½ inch of rot in those of south bulk-head, O.K. Waterway, wet swale, O.K. Bridge has been gone over this year and tightened. Ties, timbers, etc., O.K. Alignment (tangent) and surface good. Track on and off, low. Other features O.K. Bridge is in good condition.

Bridge 39.8.—Pile-bent trestle across swale. Length, 60 feet; height, 5 feet; number of spans, 4. Piles, 13–16 inches, with ½ inch of rot in those of south bulk-head, O.K. Waterway, wet swale, O.K. Bridge has been gone over this year and tightened. Ties, timbers, etc., O.K. Alignment (tangent) and surface good. Track on and off, low. Other features O.K. Bridge is in good condition.

Bridge 40.0.—Pile-bent trestle across swale. Length, 60 feet; height, 5 feet; number of spans, 4. Piles, 12–14 inches, with ½ inch of rot in those of both bulk-heads, O.K. Waterway, wet swale, O.K. Bridge has been gone over this year and lined and tightened. Ties, timbers, etc., O.K. Alignment (tangent) and surface good. Track on and off, low. Other features O.K. Bridge in good shape.

Bridge 40.5.—Pile-bent trestle across Fitzsimmons Creek. Length, 135 feet; height, 6 feet above water; number of spans, 9. Waterway, double, O.K. Piles, 12–16 inches, with ½ inch of rot in those of south bulk-head; others, in water, sound; O.K. Bridge has been gone over this year and tightened. Ties, timbers, braces, etc., O.K. Alignment (tangent) and surface good. Track on and off, low. Other features O.K. Bridge in general in good condition.

Bridge 42.3.—Pile-bent trestle across a portion of Green Lake. Length, 270 feet; height, 6 feet above water; number of spans, 18. Piles, 12–15 inches, with sap-rot only in those in dry

ground. Waterway O.K. Bridge has been gone over this year and tightened. Ties, timbers, braces, etc., O.K. Alignment (tangent) and surface good. Track on and off, low. Other features O.K. Bridge is O.K.

Bridge 43.5.—Pile-bent and log-pier trestle across Wedge Mountain Creek. Original length, 90 feet; height, 10 feet; number of spans, 3 (30 feet each). South bulk-head bent and Span No. 1 washed out, together with 60 feet of road-bed at south end during the October flood. That portion of road-bed and bridge replaced by temporary trestle from material cut close by. Sixty-foot Howe truss will replace No. 1 span and portion of old road-bed. Remainder of road-bed has been rock-filled. Truss will be built as soon as gang finishes at Cheekye. Will then be: Length, 120 feet; height, 10 feet; and number of spans, 3. Piers in midstream are rock-filled log cribs, sound except No. 1, damaged by flood. This pier will be replaced by new truss-pier crib. Bridge was gone over this year. Now under slow order. Out of line and surface. Alignment (tangent). Riprap and river-protection cribs needed. Track on and off, low.

Bridge 43.7.—Pile-bent trestle across 10-foot creek. Length, 30 feet; height, 10 feet; number of spans, 2. Waterway needs riprap and fill at north bulk-head account scoured. Piles, 12–14 inches, with rot in end bents to 1¾ inches, O.K. Bridge gone over this year and tightened. Ties, timbers, braces, etc., O.K. Alignment (tangent) and surface good. Track on and off, low. Other features O.K.

Bridge 44.1.—Through Howe truss, 125 feet, without approach bents, across Green River. Length, 125 feet; height, 10 feet; number of spans, 1. Waterway O.K. Bridge-seats on pile-bents. Piles, 12–14 inches, with rot up to 1 inch in some; others sound; O.K. Bridge has been gone over this year and tightened throughout, including adjusting the truss-rods. All ties, timbers, braces, etc., O.K. Floor-beams, stringers, bearings, laterals, compression members, etc., O.K. Some lower chord-joints open. Tension members O.K. Castings, gib-plates, clamps, keys, etc., O.K. Line and camber good. Alignment (tangent) and surface good. Track on and off, fair. Other features O.K. Bridge in general in good shape.

Bridge 48.4.—Through Howe truss, 150 feet, across Soo River, with twenty-one frame-bent spans on M.B. and thirty frame-bent spans on piles in the south approach, and three frame-bent spans on M.B. and one frame-bent span on piles in the north approach. Length over all, 980 feet; height of approaches, up to 1 story and cripple; number of spans, 56. Height above water, 30 feet. Piles, 12–16 inches, with rot up to 1 inch in those on dry ground only, O.K. Waterway O.K. Bridge has been gone over this year and tightened throughout, including adjusting the truss-rods. Also one new diagonal and one sway-brace put on. Ties, timbers, posts, M.B., caps, sills, stringers, braces, and truss timbers O.K. Compression and tension members O.K. Laterals O.K. Pile towers, with rot to 1 inch, and bridge-seats O.K. Castings, gib-plates, clamps, keys, etc., O.K. Lower chord O.K. Line and camber good. Alignment (curve and tangent) and surface good. Track on and off, fair. Other features O.K. Bridge in general is in good condition.

Bridge 52.3.—Through Howe truss, 125 feet, across 6-Mile Creek, without approach spans. Length, 125 feet; height above water, 16 feet; number of spans, 1. Framed spans on M.B. O.K. Waterway O.K. Riprap O.K. Bridge has been gone over this year and tightened through, including adjusting the truss-rods. Ties, timbers, floor-beams, bridge-seats, braces, stringers, and other timbers O.K. Lower chords O.K.; joints tight. Tension, compression, and laterals O.K.; some of laterals poorly framed. Castings, gib-plates, clamps, keys, etc., O.K. Line and camber good. Alignment (tangent) and surface O.K. Track off south end, fair; off north end, low. Other features O.K. Bridge in general in good condition.

Bridge 53.6.—Pile-bent trestle across dry gulch. Length, 75 feet; height, 15 feet; number of spans, 5. Piles, 12–14 inches, cedar and fir, with rot up to 2 inches. One pile in north bulk-head completely gone; needs new one. Bridge gone over this year and tightened. Ties, timbers, braces, etc., O.K. Alignment (tangent) and surface good. Track on and off, low. Other features O.K.

Bridge 57.1.—Pile-bent trestle across 1-Mile Creek at Pemberton. Length, 135 feet; height, 12 feet; number of spans, 9. Waterway, mountain stream subject to violent floods; more or less choked up since the October flood with logs and trees, which will have to be cleared as soon as the ice and snow permit. Log-jam against bridge. Channel needs cleaning. Several river-protection cribs needed in early spring. Bridge needs more rip-rap. Piles, 12–16 inches, sound, those in south bulk-head being new and driven this year. Bridge has been gone over this

year and tightened; also one new cap put in. Ties, timbers, braces, etc., O.K. Alignment (curve and tangent) and surface good. Track on and off, low. Other features O.K. Bridge in general in good shape.

Bridge 58.0.—Across the Lillooet River at Pemberton. One 60-foot, one 150-foot, and one 100-foot through Howe-truss spans, with 189 pile-bent approach spans at the south and five pile-bent approach spans at the north, of which one has been reinforced by posts and M.B. on account of rot. Needs new bent driven. Piles in south approach are in wet ground and have rot to ¾ inch; O.K. Those in north approach have rot to 2 inches and O.K., except as noted. Piles in bridge towers O.K. Piles in general, 14–18 inches, barked cedar, and O.K. Length of bridge over all, 3,220 feet; height, 17 feet; number of spans, 197. North and south bulk-heads are on M.B., have had one cap changed, have been properly blocked and shimmed, and whole bridge tightened throughout, including adjusting the truss-rods, this year. Waterway, 300 feet wide (350 feet in flood), O.K. Riprap O.K. Ties, timbers, caps, stringers, floor-beams, bridge-seats, truss timbers, braces, etc., O.K. Tension and compression members and laterals O.K. Some lower chord-joints open. Castings, gib-plates, clamps, keys, etc., O.K. Line and camber good. Alignment (tangent, curve, and tangent) and surface good. Other features O.K. Track on and off, very low. Bridge, except as noted, is in good condition.

Bridge 58.8.—Pile-bent trestle over slough. Length, 60 feet; height, 16 feet; number of spans, 4. Waterway O.K. Piles are barked fir, 14–16 inches, with up to 3 inches of rot in bulk-head bents; others all sound. Bridge not gone over this year; needs tightening. Ties, timbers, braces, etc., O.K. Alignment (tangent) and curve good. No check-rails or plates. Track on and off, a little low. Other features O.K.

Bridge 64.3.—Through Howe truss, 100 feet, across Owl Creek, with one pile-bent approach span at each end. Piles in towers are in riprap and creek and from such examination as could be made appear sound. Piles in south bulk-head have rot to 3 inches; those in north bulk-head from 2 to 5 inches. Bridge not gone over this year, except to the extent of tightening all bolts and putting in temporary posts and M.B. at bulk-heads to serve until eight 25-foot piles can be driven. Length over all, 130 feet; height, 15 feet; number of spans, 3. Waterway subject to violent floods. Ties, guard-rails, caps, stringers, floor-beams, braces, bearings, and all other timbers O.K., except two new caps needed at bulk-heads. Wing-walls, cribs, and riprap O.K. Government Hatchery cribs damaged. Alignment (curve) and surface good. Compression members and laterals O.K. Tension members need adjusting. Castings, gib-plates, clamps, keys, etc., O.K. Many joints of lower chords open to extent of 1/16 to 1/8 inch. Line O.K. Camber fair, but a little uneven in spots. Track on and off, slightly low. Other features O.K.

Bridge 65.3.—Through Howe truss, 130 feet, across Birkenhead River, with two pile-bent trestle approach bents at each end. Length over all, 190 feet; height, 15 feet; number of spans, 5. Waterway, 110 feet wide, O.K. All on barked fir piles, 12–13 inches, with rot up to 3 and in one instance to 5 inches. Twenty long M.B. put in during the year and twenty-four 12- by 12- by 8-foot posts and M.B. reinforcements were also put in the towers. Otherwise bridge only gone over to the extent of tightening all bolts. Ties, guard-rails, stringers, floor-beams, bearings, braces, caps, and all timbers in general O.K. Bottom chords O.K. and joints tight. Tension members need adjusting. Upper and lower laterals O.K. Compression members O.K. Line and camber good. Alignment (tangent) slightly out on north end. Surface good. No tie-plates. Track on and off, a little low. Riprap O.K. Other features O.K.

Bridge 69.6.—Pile-bent trestle across mountain stream subject to heavy floods. Length, 75 feet; height, 8 feet; number of spans, 5. Waterway, scattered stream 70 feet wide. South bulk-head was riprapped this year. Needs river-protection crib above same. Other than as noted, no work done on this bridge during the year. Piles, 12–13 inches, with rot in a few to ½ inch. Bridge needs tightening. Ties, timbers, etc., O.K. Alignment (spiral) and surface good. Track on and off, low. No tie-plates. Other features O.K.

Bridge 70.3.—Pile-bent trestle across mountain-stream. Length, 45 feet; height, 7 feet; number of spans, 3. Waterway, scattered stream 20 feet wide, O.K. Riprap O.K. Piles, 12–13 inches, with 1½ inches of rot in bulk-head bents, O.K. Good for one year yet. Others sound. Bridge not gone over this year. Ties, timbers, etc., O.K. Bridge needs tightening. Alignment (tangent) and surface good. Track on and off, low. No check-rails nor tie-plates. Other features O.K.

Bridge 71.3.—Pile-bent trestle across Pool Creek. Length, 45 feet; height, 8 feet; number of spans, 3. Waterway, stream 10 feet wide and 2 feet deep, O.K. Riprap O.K. Bridge has

not been gone over this year. Piles, 12–14 inches, with rot in south bulk-head to 2 inches and in last two bents at north to 3 inches. Needs twelve short M.B. and two new caps in bulk-heads in spring. Ties, timbers, braces, etc., O.K. Needs one new pile-bent. Bridge needs tightening. Track on and off, low. No tie-plates nor check-rails. Other features O.K. Alignment (tangent) and surface good.

Bridge 74.5.—Pile-bent trestle across mountain stream. Length, 45 feet; height, 6 feet; number of spans, 3. Waterway, stream 5 feet wide (40 feet in flood), needs riprap under bridge at north bulk-head. Bridge not gone over this year. Piles, 12–14 inches, with rot in bulk-head and No. 2 bents to 2 inches; others sound. North bulk-head cap to be replaced and one split guard-rail to be replaced. Bridge needs tightening and shimming. Other timbers, ties, etc., O.K. Alignment (tangent) O.K. Surface a little low at centre. Track on and off, fair. No check-rails nor tie-plates. Other features O.K.

Bridge 78.4.—Pile-bent trestle at Gates Ranch. Length, 60 feet; height, 6 feet; number of spans, 4. Waterway, dry wash the width of the bridge-length, subject to sudden and violent floods, carrying great quantities of broken-rock debris. Riprap and protection-cribs O.K., but need constant watching. Bridge not gone over this year. Needs tightening and two new caps and eight 25-foot piles for the bulk-heads. Other timbers, ties, etc., O.K. Piles, 12–14 inches, with from nothing to 1 inch of rot, except in the bulk-head bents, were there is rot of from 2 to 3 inches. Alignment (curve) and surface good. Track on and off, low. Other features O.K.

Bridge 79.1.—Combined frame and pile-bent trestle across dry gulch. Length, 135 feet; height, up to 1 story. Waterway, none. Originally all on pile footings. First two bents at south and last three at north, including bulk-heads, are pile-bents. Twelve 25-foot, four 30-foot, and four 35-foot piles now on ground to replace these bents in the spring. Bridge not gone over this year, except to the extent of putting M.B. under one bent. All pile-bents are on piles with auxiliary M.B. Piles light, 11–12 inches, with varying degrees of rot. Thirty-five more 3-foot M.B. to be put in in the spring. All ties, timbers, braces, etc., O.K. Bridge needs tightening and shimming at Bent No. 3. Alignment (curve) good. Surface low at Bent No. 3. Track on and off, very low. Other features O.K.

Bridge 81.3.—Pile-bent trestle across Anderson Creek. Length, 60 feet; height, 7 feet above water; number of spans, 4. Waterway, slow-moving stream 20 feet wide and 3 feet deep, O.K. Piles, 11–13 inches, cedar; those in water all sound; those in bulk-heads have up to 3 inches of rot and should be redriven in the spring. South bulk-head cap needs replacing. Bridge not gone over this year; needs tightening. Ties, timbers, braces, etc., O.K. Alignment (tangent) and surface O.K. Track on and off, very low. No tie-plates nor check-rails. Other features O.K.

Bridge 82.4.—Pile-bent trestle across stream. Length, 30 feet; height, 7 feet; number of spans, 2. Waterway, stream 6 feet wide (20 feet in flood), O.K. Riprap O.K. Piles in bulk-heads small and rotted to 2½ to 3 inches; have been temporarily taken care of by blocking. Eight new piles to be put in in the spring, as well as two new caps. Piles in water O.K. Other timbers, ties, braces, etc., O.K. Bridge not gone over this year; needs tightening and lining. Alignment (tangent) out. Surface good. Track on and off, very low. No tie-plates nor check-rails. Other features O.K.

Bridge 83.1.—Pile-bent trestle across mountain stream. Length, 45 feet; height, 5 feet; number of spans, 3. Waterway, stream 40 feet wide. Riprap and protection-cribs O.K. Piles, 11–13 inches, all in water, are sound. Those in north bulk-head driven about a year ago; those in south bulk-head have rot to 2 inches. Bridge not gone over this year; needs tightening. All timbers, ties, etc., O.K. Alignment (tangent) and surface good. Track on and off, very low. No tie-plates nor check-rails. Other features O.K.

Bridge 84.7.—Through Howe truss, 100 feet, across Anderson Creek, with one trestle approach span at south end and two trestle approach spans at north end. All on piles. Length over all, 145 feet; height, 12 feet; number of spans, 4. Piles in towers O.K. Piles 12–13 inches; those in bulk-heads (in dry ground) have rot to 3 and in one case 4 inches. These have been temporarily reinforced by posts and M.B. In the first and second bents north and the south bulk-head twelve new 25-foot piles will be driven; same now on ground. Two new caps will also be put in. Other than temporary work, bridge not gone over this year. Waterway, 30 feet wide (100 feet in flood), O.K. Riprap, crib, and wing-walls O.K. Other than the two caps to be replaced, all timbers throughout approaches and truss are sound and O.K. Braces O.K. Compression and tension members O.K. Laterals O.K. Chords, floor system, seats, etc., O.K.

Whole bridge needs tightening and truss-rods need adjusting. Line and camber good. Castings, gib plates, clamps, keys, etc., O.K. Alignment (tangent) out slightly on north approach. Surface good. No tie-plates. Track on and off, fair. Other features O.K.

Bridge 87.8.—Framed-bent trestle across small mountain stream. Original bridge here carried out a few years ago by a slide. Present bridge is comparatively new. Length, 60 feet; height, 16 feet; number of spans, 4. Waterway, stream 4 feet wide, O.K. Construction is of piles and round cedar posts, 14–16 inches, on combined M.B. and pile footings. Piles, 11–12 inches, have rot to 3 inches, and four new 20-foot piles are needed in the bulk-head bents. Six new 3-foot M.B. also needed. First bents out from each end have one batter-post each. All ties, timbers, braces, etc., are O.K. Bridge has not been gone over this year. Alignment (curve) good. Surface out. Rail next to hillside shimmed. Shims should be taken out and bents shimmed as follows: Centre-bent, ½ inch; next north, 1½ inches; and north bulk-head, 2 inches. Track on and off, low. No tie-plates nor check-rails. Two new caps needed at bulk-heads. Other features O.K.

Bridge 88.41.—Deck Howe truss, 60 feet, across rock gap and portion of Anderson Lake, with one 15-foot approach span at south end and one 12-foot approach span at north end. Waterway, lake, O.K. Length 87 feet; height, about 25 feet above water; number of spans, 3. All on M.B., which are O.K. New cap needed on north bulk-head. Bridge not gone over this year; needs tightening and adjusting of truss-rods. All ties, timbers, braces, etc., throughout sound and O.K., except south end of lower chord, which was covered by slide and has skin-rot; not dangerous. Tension members need adjusting. Compression members and laterals O.K. Bearings O.K. Castings, plates, etc., O.K. South end bulk-head rests on log crib, O.K. Line and camber good. Alignment (curve) and surface good. Track on and off, low.

Bridge 88.46.—Framed-bent trestle on M.B., which are O.K. Length, 120 feet, number of spans, 8; height, 30 feet. Waterway, none. Danger here from falling rocks. Bridge not gone over this year. One new diagonal needed. All other timbers, ties, braces, etc., O.K. Bridge needs tightening. North bulk-head on log crib O.K. Track on and off, low. Alignment (curve) and surface good. Other features O.K.

Bridge 88.9.—Should be 88.93. Framed trestle on M.B., which are O.K. Length, 150 feet; height, 1 story; number of spans, 10. No waterway. Bridge not gone over this year. Two new sway-braces needed. Other timbers, ties, braces, etc., O.K. North bulk-head on log crib O.K. Bridge needs tightening. Alignment (curve) and surface good. Track on and off, fair. Other features O.K.

Bridge 89.77.—Framed-bent trestle on M.B., which are O.K., except a couple at north bulk-head which are covered and rotting. New cap also needed at that point. Waterway, small mountain stream 3 feet wide, O.K. Some footings covered at south end. Length, 135 feet; height, 30 feet; number of spans, 9. Bridge not gone over this year; needs tightening. Timbers, ties, braces, etc., except as noted, O.K. Alignment (tangent) and surface good. Track on and off, low. Other features O.K.

Bridge 89.1.—Framed-bent trestle on M.B., which are O.K. Length, 285 feet; height, 1½ stories; number of spans, 19. Waterway, none. Timbers, ties, braces, etc., O.K. Bridge not gone over this year. Track on and off, low. Alignment (tangent and curve) and surface good. No plates on tangent portion. Other features O.K.

Bridge 89.5.—Framed-bent trestle on M.B., which are O.K. No waterway. Length, 210 feet; height, 1 story and cripple; number of spans, 14. North bulk-head is on log crib, which is O.K. New cap and four new M.B. needed at that bulk-head. Danger from falling rock. Should be watched constantly by sectionmen. Not gone over this year; needs tightening. Ties, timbers, braces, etc., except as noted, O.K. Alignment (curve) and surface good. Track on and off, low. Other features O.K.

Bridge 89.9.—Should be 89.96. Framed-bent trestle on M.B., which are O.K. Grasshopper bents. Length, 120 feet; height, 25 feet; number of spans, 8. No waterway. Six new M.B. and two new caps needed for bulk-heads. One guard-rail with short piece of dry-rot should also be replaced. All other ties, timbers, braces, etc., O.K. South bulk-head is on rock-filled crib, which is O.K. Track off south end, high; off north end, low. Alignment (tangent) and surface good. Other features O.K.

Bridge 90.2.—Framed-bent trestle on M.B., which are O.K., except three under north bulk-head which need replacing, as does also the cap at same point. Some M.B. next to hillside

covered by rock-slide. No waterway. Length, 225 feet; height, 2 stories and cripple; number of spans, 15. Bridge not gone over this year. Other than as noted, all timbers, ties, braces, etc., O.K. Alignment (tangent) and surface good. Track on and off, good. Other features O.K.

Bridge 91.5.—Pile-bent trestle across McGillivary Creek. Length, 120 feet; height, 15 feet; number of spans, 8. Waterway, stream 30 feet wide. Drift to be taken out. Piles, 12–17 inches; those in dry ground on south side have rot to 4 inches; those on north side up to 3 inches. Bents Nos. 1, 2, and 3 need four new 20-foot piles each; reinforced temporarily by three posts and M.B. Piles in water sound. Two new caps needed. Bridge not gone over this year. Other than as noted, all timbers, ties, braces, etc., O.K. Alignment (curve) and surface good. Track on and off, low. Other features O.K.

Bridge 93.5.—Pony Howe truss, 60 feet, across Roaring Creek, with one pile-bent trestle approach span at each end. Length, 90 feet; height, 12 feet; number of spans, 3. Waterway, mountain stream 30 feet wide, O.K. Piles, 12–16 inches, with 2½ to 3 inches of rot in bulk-heads and south tower; rot in those of north tower from 0 to 1 inch. Temporarily reinforced. Need two new caps, twenty long mud-blocks, twelve short mud-blocks, and twenty 12- by 12- by 9-foot posts for north and south bulk-heads and tower. Other than as noted, all timbers, ties, braces, etc., O.K. Bridge not gone over this year; needs tightening. Lower chords O.K. Tension members need adjusting. Compression members O.K. Lateral connections O.K. Castings, gib-plates, etc., O.K. Alignment (curve) and surface good. Track on and off, low. Other features O.K.

Bridge 93.9.—Should be 93.94. Framed-bent trestle on M.B. Length, 210 feet; height, 1 story and cripple; number of spans, 14. No waterway. Six new mud-blocks and two new caps needed for bulk-heads. Posts and M.B. of five bents buried in rock-slide. Danger of damage from rocks here; should be closely watched. Bridge not gone over this year. Except as noted, all timbers, ties, braces, etc., O.K. South bulk-head low, needs shimming. Alignment (tangent) good. Surface good, except low at south bulk-head. Track on and off, low. Other features O.K.

Bridge 94.0.—Should be 94.05. Framed-bent trestle on M.B. No waterway. Length, 150 feet; height, up to 1½ stories. Footings O.K. All ties, timbers, braces, etc., O.K. Bridge not gone over this year. Alignment (curve and tangent) good. Track on and off, low. Other features O.K. Bridge is in good condition.

Bridge 94.02.—Should be 94.1 Framed-bent trestle on M.B. No waterway. Length, 90 feet; height, up to 1 story and cripple; number of spans, 6. Bridge not gone over during the year. Six M.B. and two new caps needed for bulk-heads. One new diagonal needed. All other timbers, ties, braces, etc., O.K., although some timbers are scarred by fallen rocks and others are sun-checked and warped. Alignment (reverse spirals) and surface fair. No tie-plates. Track on and off, fair. Other features O.K.

Bridge 94.6.—Framed-bent trestle on M.B., which are O.K. Length, 90 feet; height, up to 1 story and cripple; number of bents, 6. Waterway, none; small flowing springs. Not gone over this year. Needs tightening and lining. All timbers, ties, braces, etc., O.K. Alignment (tangent) poor. Surface fair. Track on and off, low. Other features O.K.

Bridge 95.0.—Should be 95.03. Pony Howe truss, 60 feet, across Lake Creek, with two pile-bent trestle approach bents at each end. Length, 120 feet; height, 15 feet; number of spans, 5. Waterway, mountain stream 6 feet wide, O.K. Track on and off, O.K. Alignment (tangent and curve) good. Surface poor on north approach; needs shimming. Bridge not gone over this year. Piles, 10–16 inches, with rot to 3 inches in north bulk-head. One bent in north approach is framed on pile footings; had settled and had been blocked and shimmed; now working loose. Repairs needed; twelve long M.B., two caps, sixteen 12- by 12- by 10-foot posts, eight 25-foot piles, and eight 30-foot piles for Bents Nos. 1 and 2 north and 1 and 2 south. Some tightening needed and truss-rods to be adjusted. Other than as noted, all ties, timbers, braces, etc., O.K. Tension members need adjusting. Compression members and laterals O.K. Castings, plates, etc., O.K. Line and camber good. Other features O.K.

Bridge 98.0.—Should be 98.04. One 20-foot span on M.B., which are O.K. Length, 20 feet; height, 8 feet; number of spans, 1. Waterway, edge of Anderson Lake, O.K. Bridge not gone over this year; needs tightening. All ties, timbers, braces, etc., O.K. Alignment (curve) fair. No check-rails. Surface good. Other features O.K. Track on and off, fair.

Bridge 99.4.—One 30-foot span on M.B., which are O.K. Length, 30 feet; height, 3 feet; number of spans, 1. Bridge not gone over this year; needs tightening. Waterway, edge of Anderson Lake, O.K. All ties, timbers, braces, etc., O.K. Alignment (curve) fair (of track at north end poor). Surface good. No check-rails. Other features O.K.

Bridge 100.6.—Pile-bent trestle across Portage River at lower end of Anderson Lake. Length, 180 feet; height, 12 feet; number of spans, 10, of which two are of 30 feet each. Waterway, 120 feet, O.K., although some trouble here at times on account of drift. Bridge not gone over this year, and besides tightening needs three new caps and ten 20-foot piles for Bents Nos. 1 and 2 south and No. 1 north; also one new tie. Except as noted, all other ties, timbers, braces, etc., O.K. Alignment (curve) fair. Surface good. Piles, 12–16 inches; those in water are sound; those in bulk-heads and dry ground have rot to 4 and 5 inches. Track on and off, low. Other features O.K.

Bridge 101.3.—Pile-bent trestle across Portage River at Seton. Length, 225 feet; height, 22 feet; number of spans, 14, including one of 30 feet. Slow order on this bridge until repaired. Stream hits bridge on angle and drift inclined to lodge and damage the bridge; has done so in the past. Should have been a 100-foot span here. Not gone over this year. Original bent at north end of the 30-foot span damaged. Repaired by new piles, but same was poor job. Needs new tower. Piles, 10–14 inches; those in dry ground have rot to 5 inches; one in north bulk-head is completely gone. Besides tightening, this bridge needs seven new caps, eight 20-foot piles, eight 25-foot piles, eight 30-foot piles, and fourteen 40-foot piles. All other ties, timbers, braces, etc., O.K. Alignment (tangent) and surface only fair. Log protection-crib above bridge would help situation. No tie-plates. Track on and off, low. Other features O.K.

Bridge 103.1.—Framed-bent trestle on M.B., which are O.K. Waterway, none; dry rock gap subject to rock-falls; danger from same and should be watched. Height, 2 stories; length, 75 feet; number of spans, 5. Both bulk-heads shimmed up. Bridge not gone over this year. Besides some tightening, needs two new caps, six M.B., twelve ties, and four new sections of guard-rails. Other than as noted, all timbers, ties, braces, etc., O.K., although some are scarred by fallen rocks. Alignment (curve) good. Surface low at bulk-heads. Track on and off, low. Other features O.K.

Bridge 103.43.—Framed-bent trestle on M.B., which are O.K. Length, 30 feet; height, 15 feet; number of spans, 2. Waterway none. North bulk-head rests on log crib, which is O.K. Bridge not gone over this year and needs some tightening and shimming. Ties, timbers, braces, etc., O.K. No tie-plates nor check-rails. Alignment (tangent) O.K. Surface good. Track on and off, low. Other features O.K.

Bridge 103.47.—Framed-bent trestle on M.B., which are O.K. Both bulk-heads rest on rock-filled cribs, which are O.K.; that at south being the same that carries Bridge 103.43. Length, 207.9 feet; height, 22 feet; number of spans, 14. Waterway, none. Bridge not gone over this year; needs some tightening. Alignment (tangent with curves at both ends) and surface fair. Ties, timbers, braces, etc., O.K. Track on and off, low. No tie-plates at south end. Other features O.K.

Bridge 107.2.—Pile-bent trestle. Length, 60 feet; height, 7 feet; number of spans, 4. Waterway, dry wash, subject to floods, carrying quantities of broken rock, O.K. Bridge not gone over this year. Piles, 11–13 inches, which in bulk-heads have rot to 3 inches, one being entirely gone; others have from 1½ to 2½ inches of rot. Besides tightening, bridge needs two new caps and eight 20-foot piles for the bulk-heads. Other timbers, ties, braces, etc., O.K. Alignment (spiral) and surface good. No check-rails nor tie-plates. Track on and off, low. Other features O.K.

Bridge 108.0.—Should be 108.1. Pile-bent trestle across small creek. Length, 60 feet; height, 15 feet; number of spans, 4. Waterway, stream 1½ feet wide, O.K. Bridge not gone over this year. Piles, 13–16 inches; those in water are sound; others have to 3 inches of rot. Besides tightening, bridge needs twelve M.B., two caps, and eight 20-foot piles for the bulk-heads. One stringer at south has some end-rot; not dangerous. Except as noted, ties, timbers, braces, etc., O.K. Alignment (tangent) and surface good. No tie-plates nor check-rails. Track on and off, low. Other features O.K.

Bridge 108.7.—Pile-bent trestle across small creek. Length, 30 feet; height, 8 feet; number of spans, 2. Waterway, 4-foot stream, O.K. Bridge not gone over this year. Piles, 12–16 inches. Centre bent in water, sound. Bulk-heads have 3 to 5 inches of rot. Besides tightening, bridge needs six M.B., two caps, and six 20-foot piles. Other than as noted, ties, timbers, braces, etc., O.K. Alignment and surface good. No check-rails. Track on and off, low. Other features O.K.

Bridge 109.9.—Framed trestle on M.B., which are O.K. Length, 195 feet; height, up to 1 story and cripple; number of spans, 13. Waterway, none. Subject to recurring rock-slides; needs watching. Not gone over this year. Many posts and footings buried in rock-slides. Ties, timbers, braces, etc., O.K. Alignment (curve and tangent) and surface fair. Track on and off, low. Other features O.K.

Bridge 110.1.—Framed-bent trestle on M.B. Length, 135 feet; height, up to 1 story and cripple; number of spans, 9. Waterway, none; dry gulch, subject to slides and rock-falls. Some of footings and posts buried in slide. Bridge not gone over this year. Needs tightening and 4 M.B., two caps, and four 20-foot piles. Other timbers, ties, braces, etc., O.K. Alignment (curve) good, except at south end. Surface good. Track on and off, low. Other features O.K.

Bridge 111.1.—Framed-bent trestle on M.B., which are O.K. Waterway, none. Length, 240 feet; height, 1 story and 8-foot cripple; number of spans, 16. Last three bents at north are pile-bents. Piles, 12–16 inches, with 3 inches of rot. To be replaced with four 20-foot, four 25-foot, and four 30-foot piles. Also needs one new cap and one guard-rail section. Some footings buried in slide. Other timbers, ties, braces, etc., O.K. Alignment (tangent) slightly out at centre and surface good. Track on and off, low. No flanger-sign at north. Other features O.K.

Bridge 115.04.—Trestle (pile-bent). Length, 46 feet; height, 8.5 feet; and number of spans, 3. Waterway completely filled up by slide. Only signs of the bridge are long ties and chewed-up portions of guard-rails. No longer a bridge.

Bridge 116.5.—New 15-foot span sheeted in to act as open culvert. Across wash-out. Built about a year ago. On new pile-bent bulk-heads, O.K. Length, 15 feet; number of spans, 1; height, 6 feet. Not gone over this year. Ties, timbers, piles, etc., O.K. Piles, 11–13 inches. Line and surface O.K. Track on and off, fair.

Bridge 118.0.—Pile-bent trestle across Seton River. Length, 150 feet; height, 18 feet; number of spans, 9, of which one is 30 feet. Waterway, 100 feet wide and about 3 feet deep, O.K. South bulk-head riprapped this year; otherwise bridge not gone over. Piles, 12–14 inches; rot from 1½ to 2 inches and in the case of one pile in bulk-head to 3 inches; O.K. Ties, timbers, braces, etc., O.K. Alignment (curve and tangent) and surface good. This bridge should have been a 100-foot span. Track on and off, low. Other features O.K.

Bridge 118.1.—Through Howe truss across Cayoosh Creek, 100-foot span, with one pile-bent trestle approach span at each end. Length, 130 feet; height, 10 feet; number of spans, 3. Not gone over this year. Waterway, 80 feet wide and 3 feet deep, O.K. South tower riprapped this year. Piles, 14–15 inches, with rot in some to 1½ inches; in one pile to 4 inches. Bulk-head bent at south was put in new eighteen months ago; new piles should be put in north bulk-head this coming year. Pile towers O.K. Ties, guard-rails, stringers, floor-beams, seats, caps, braces, truss-timbers, etc., O.K. Bridge needs some tightening. Tension members need adjusting. Compression members O.K. Some truss-timbers warped. Lower chords, some joints open to thickness of knife-blade. Castings, gib-plates, clamps, keys, etc., O.K. Laterals O.K. Line O.K. Camber fair (a little uneven, but B. and B. report they cannot improve). Alignment (tangent) and surface good. Track on and off, good. Other features O.K.

Bridge 120.6.—Across the Fraser River at Lillooet. Two 130-foot and four 150-foot deck Howe trusses, with seventy-five trestle approach spans at the south end and forty-three trestle approach spans at the north end; all originally framed bents on pile-bents or pile footings. Length, 2,630 feet; height, about 60 feet above river; number of spans, 124. Waterway, river about 800 feet wide at low water, O.K. Bridge gone over to following extent during the year: twenty-three pile-bent footings in north approach replaced by framed bents on M.B.; all guard-rail bolts tightened and the last span on north tightened and adjusted throughout. B. and B. called away from this work on a number of occasions, such as to Squamish Dock, etc. Now working at that point again. Twenty-one more framed footings to go in at north approach. Mud-blocks and framed bents also needed in south approach. Ground, especially at north (a chocolate-coloured soil), very destructive to pile footings. When work now in progress is completed, some tightening done, and the remaining trusses adjusted, this bridge will be in A1 shape. Trusses supported on framed towers on piles in rock-filled timber cribs, except north tower, which is of piles in crib. Three cribs to protect the bank and slope were built below the north abutment and two cars of rock put in same during the year. Also twenty-three car-loads of riprap placed around the north abutment and the first, second, and third piers south of that

abutment. Now O.K. Cribs and piles at towers apparently O.K. Piles are of all sizes and, in other than the towers, with varying degrees of rot. Those on north side of river worst. Some piles went at or just under the ground surface; others at a depth of 6 to 8 feet. Where bents have not been replaced temporary reinforcements have been put in and footing situation not dangerous. All ties, stringers, floor-beams, caps, bearings, posts, sills, braces, truss-timbers, etc., O.K. Upper and lower chords O.K. Laterals O.K. Tension members in first five trusses need light adjustment. Compression members O.K. Castings, gib-plates, clamps, keys, etc., O.K. Bridge is fairly tight. Line and cambers good. Alignment (tangent with curve off north end) and surface good. Track on and off, low. All other features O.K.

The above completes the bridges on the Squamish Subdivision (122 miles). All material for the work to be done during the coming year on the bridges between Pemberton and Lillooet has been distributed at the points where it is to be used. The items of material include five 16-foot guard-rails; twelve 12-foot ties; three 28-foot diagonals; sixty 12- by 12- by 7-, 8-, and 10-foot posts; fifty-seven caps; 125 short mud-blocks; seventy-two long mud-blocks; sixty-four 20-foot piles; sixty-four 25-foot piles; twenty-eight 30-foot piles; eight 35-foot piles; and fourteen 40-foot piles. The above does not include any of the material to be used in Bridge 120.6, a large part of which is also on the ground. The above materials were all loaded and unloaded by the B. and B.

Bridges between East Lillooet and Williams Lake—Lillooet Subdivision.

Bridge 1.7.—Pile-bent trestle over dry sand-slide. Length, 150 feet; height (on lower side), 12 feet; number of spans, 10. On lower side ground has slid away to depth of 3 feet. Waterway, none. Piles, 12–14 inches, barked fir, with rot in some to 3 inches. A few need replacing soon. Four slope-protection cribs, one below the other between the bridge and the Fraser River; some damaged. During the year the following renewals and repairs were made: A crib 9 feet high and 25 feet long; a crib 7 feet high and 48 feet long; a crib 4 feet high and 58 feet long; and a double crib 5 feet high and 86 feet long were built; 1½ feet in height was added to a crib 28 feet long and 6 feet to a crib 32 feet long. During the year bridge was tightened and one new stringer and one diagonal were put in. Ties, timbers, braces, etc., O.K. Water-barrels, check-rails, flanger-signs, etc., O.K. Alignment (reversed spirals) and surface good. Track on and off, low. Other features O.K.

Bridge 4.7.—Combined pile-and framed-bent trestle across dry moving slide. Length, 330 feet; height, up to 1 story and cripple; number of spans, 22. Waterway, none. Bridge gone over this year and tightened and five new girts, nine diagonals, and one batter-post were put in to replace those damaged by rocks. Pile bents and footings were also all sheeted in as a protection. Many of the posts along upper side had had corners chewed off by rocks. These were protected from further damage about eighteen months ago by the installation of fenders. Piles, 12-16 inches, unbarked cedar, with 1 to 2 inches of rot, O.K. Timbers, ties, braces, etc., O.K. Danger of damage by rocks and should be constantly watched. Alignment (tangent and curve) and surface good. Track on and off, a little low. Other features O.K.

Bridge 9.3.—Combined framed- and pile-bent trestle across Fountain Creek. Length, 480 feet; height, up to 4 stories; number of spans, 31, including one of 30 feet over the Cariboo Road. Waterway, stream 6 feet wide, O.K. Cribbing O.K. Piles, 12–14 inches barked fir, with 1½ to 5 inches of rot; during the year fifty-seven of these were renewed with new piles and twenty-seven M.B. reinforcements were put in; now O.K. Bridge was also shimmed, lined, and tightened. Beginning at south, first two bents are pile-bents; next seven are framed on pile footings; next seven are framed on M.B.; next two are framed on combined piles and M.B.; next seven are framed on pile footings; and the last seven at the north are pile-bents. Ties, timbers, braces, etc., are O.K. Alignment (curve) and surface good. Track off north end, low.

Bridge 10.0.—Originally combined pile-bent and framed-bent trestle on pile footings. Length, 255 feet; height up to 2 stories and cripple; number of spans, 17. Waterway, dry gulch, O.K. First two bents at south were pile-bents. These and last five at the north were sinking and were repaired by putting in posts, sills, etc., about eighteen months ago. Piles are barked fir and cedar, 12–15 inches, with from 1½ to 5 inches of rot. Renewals to the extent of twenty-eight new piles and nine new M.B. were made this year and the bridge was lined, shimmed, and tightened; now O.K. Ties, timbers, braces, etc., O.K. Alignment (curve) and surface good. Track on and off, low. Other features O.K.

Bridge 10.6.—Framed-bent trestle on pile footings, except pile-bent bulk-heads and half of one bent at centre, which is on M.B., which are O.K. Length, 255 feet; height, up to 3 stories; number of spans, 17. No waterway. Piles, 10 to 15 inches; some had dry-rot to 5 inches; these were replaced this year by forty-eight new piles and three M.B.; now O.K. Bridge was also lined, shimmed, and tightened. Ties, timbers, braces, etc., O.K. Alignment (curve and tangent) and surface good. Tie-plates under curve only. Some brush to cut. Other features O.K.

Bridge 10.8.—Across 11-mile Creek and the Cariboo Road. Length, 300 feet; height up to 2 stories and cripple; number of spans, 19, one of which is 30 feet. Framed-bent trestle on pile footings, except bulk-head bents and first out from south end, which are pile-bents. Waterway, stream 5 feet wide, O.K. Piles, 10–15 inches; those in water sound; others had rot from 1½ to 4 inches; one near north end badly rotted and three in south bulk-head practically gone. Renewals to the extent of seventeen new piles and twenty-six blocks were made this year; now O.K. Bridge was also gone over and tightened. Ties, timbers, braces, etc., O.K. Alignment (curve) and surface good. Track on and off, low. Brush to cut. Other features O.K.

Bridge 13.7.—Framed-bent trestle across 14-Mile Creek. (Highest wooden bridge on the system.) Length, 915 feet; height, 200 feet; number of spans 61. Waterway, stream 4 feet wide, O.K. Bridge was gone over this year. Piles, 11–17 inches, mixed fir and cedar; some still sound, especially cedars; others with rot from 1½ to 5 inches and seventeen practically gone. Renewals this year to the extent of 143 new piles were put in. Fourteen sills were spliced and seventy-eight reinforcing M.B. were put in. Footings now O.K. Bridge also tightened. Ties, timbers, etc., O.K. Alignment (curve) and surface good. Track on and off, good. Other features O.K.

Bridge 14.0.—Across Cariboo Road. Rebuilt two years ago. Combined pile-bent and framed-bent trestle on M.B., which are O.K. Length, 90 feet; height, about 17 feet; number of spans 5, one being 30 feet. Bulk-heads on M.B.; two pile-bents and two framed bents on M.B. Piles, 12 inches, O.K. Waterway, culvert, O.K. Ties, timbers, braces, etc., O.K. Lined and tightened this year. Alignment (tangent) and surface good. Track on and off, low. Other features O.K.

Bridge 14.4.—Framed-bent trestle on pile footings, except second bent and bulk-heads, which are pile-bents. Length, 705 feet; height, up to 5 stories; number of spans, 47. Waterway, small creek, now dry, O.K. Many of piles small, 10 inches, and some to 18 inches; many are cedar. Piles had rot from 1 to 2½ inches. Renewals were made this year to the extent of 122 new piles, thirty-three M.B., and fourteen sills spliced. Bridge was lined, shimmed, and tightened. Ties, timbers, and braces, O.K. Footings O.K. Alignment (tangent) and surface O.K. Track on and off, low. Other features O.K.

Bridge 14.8.—Framed-bent trestle on pile footings, except first two, which are pile-bents, and last three, which are on M.B. Length, 375 feet; height, up to 3 stories and cripple; number of spans, 26. Waterway, dry; should be repaired and riprapped. Piles, 10–15 inches; some small firs which were badly rotted, two being completely gone. Forty-three piles were renewed this year and a few new posts and M.B. were put in. Bridge was lined and shimmed and tightened where necessary. Ties, timbers, braces, etc., O.K. Alignment (tangent) and surface good. Track on and off, fair. Other features O.K.

Bridge 17.7.—Framed-bent trestle on M.B., which are O.K. (A number are buried.) Length, 495 feet; height, 4 full stories; number of spans, 33. Waterway, stream 2 feet wide, O.K. Riprap O.K. Gone over this year; plumb and batter posts put in, one new girt, two diagonals, and three sway-braces; also three new posts put in and five put back in place. Damaged by rock. To be watched for damage by rocks. Ties, timbers, braces, etc., except three ties (not urgent), O.K. Alignment (curve) and surface, O.K. Track on and off, low. Other features O.K.

Bridge 18.3.—Framed-bent trestle on piles, except bulk-heads and first bent from each end, which are pile-bents. Length, 345 feet; height, up to 3 stories and cripple on pile-bent; number of spans, 23. Waterway, dry; heavy run-off in storms. Piles, 10–16 inches, with rot to 2 and in a few cases to 3 and 4 inches, and five practically gone. Bridge not gone over. Needs twenty-five new piles. Ties, braces, timbers, etc., O.K. Alignment (curve) and surface good. Track on and off, a little low. Other features O.K.

Bridge 20.3.—Framed-bent trestle across Pavilion Creek, at Pavilion, on pile footings. Length, 390 feet; height, 1 full story; number of spans, 26. Waterway, creek 4 feet wide, O.K.

Piles, 10–16 inches, have rot from 1 to 2 inches and in a few cases to 3 and 4 inches; ten new piles are needed. Bridge was gone over this year and a number of auxiliary M.B. and cribs were put in. Bridge was also shimmed, lined, and tightened. Ties, timbers, braces, etc., O.K. Alignment (curve) and surface good. Brush under and around bridge to be cut. Track on and off, fair. Other features O.K.

Bridge 21.6.—Framed-bent and pile-bent trestle on M.B. and piles. Length, 450 feet; height, up to 4 stories and cripple; number of spans, 30. Waterway, none. South bulk-head and Bent No. 1 are pile-bents, the next nine are framed on pile footings, and the remainder are framed on M.B., which are O.K., with the exception of a few which are buried. Piles, 10–14 inches, are barked and unbarked and a few are cedar. Piles have rot from ½ to 2½ inches and 4 new piles are needed. Small amount of work only done on this bridge this year. Ties, timbers, braces, etc., O.K., except sill of Bent. No. 3, which is cracked, not dangerous, and should be scabbed both sides with 3 by 12's. Alignment (curve) and surface good. Track on and off, good. Other features O.K.

Bridge 23.5.—Framed trestle on M.B., except Bents Nos. 2 and 32, which are pile-bents, and Bents Nos. 27–31, which are framed on pile footings. M.B. are O.K. No waterway. Length, 480 feet; height, 3 stories and cripple; number of spans, 32. Piles, 12–14 inches, with rot from 0 to 3 inches; eight new piles needed. Bridge not gone over this year. Ties, timbers, braces, etc., O.K. Alignment (curve) and surface good. Track on and off, fair. Other features O.K., except tightening.

Bridge 23.9.—Framed-bent trestle on M.B. Length, 405 feet; height, 1½ stories; number of spans, 27. No waterway. M.B. O.K., except some buried. Bridge not gone over this year. Split stringer at north bulk-head blocked up, O.K. One long girt smashed. Otherwise ties, timbers, braces, etc., O.K. Alignment (curve) and surface good. Track on and off, fair.

Bridge 24.0.—Framed-bent trestle on M.B., which are O.K. (six sets partially burned, but taken care of). Small amount of work only done on bridge this year. Length, 75 feet; height, 1 story over 15 feet; number of spans, 5. No waterway. One diagonal broken. Otherwise ties, timbers, braces, etc., O.K. Alignment (tangent) good. Surface a little low at centre. No tie-plates. Track on and off, low. Other features O.K., except tightening.

Bridge 24.6.—Framed-bent trestle on M.B., which are O.K. (Forty sets covered by slide). No waterway. Length, 465 feet; height, 2 stories; number of spans, 31. Bridge not gone over this year. Centre post, Bent No. 11, top story, badly sun-checked and cracked; should be replaced. One diagonal and girt at Bent No. 10 broken. Otherwise ties, timbers, braces, etc., O.K. Alignment (tangent) and surface good. Track on and off, good. Other features O.K., except tightening.

Bridge 24.9.—Framed-bent trestle on M.B., which are O.K. (49 sets are buried). No waterway. Length, 450 feet; height, 3 stories; number of spans, 30. One sway-brace near centre and at top of first story split and pulled away from post. Bridge not gone over this year. On upper side near centre is rock-slide which has covered posts and sills of five bents, broken two sway-braces which cannot be replaced on account of slide, and has also cracked one diagonal. Otherwise ties, timbers, braces, etc., O.K. Alignment (curve) and surface good. Track on and off, low. Other features O.K., except tightening.

Bridge 26.0.—Framed-bent trestle on M.B., which are O.K. (fifty sets buried). No waterway. Length, 210 feet; height, 1 story and short cripple; number of spans, 24. One diagonal split and one sill and post in bad order on account of fire. Temporarily repaired. Bridge not gone over this year. Other than as noted, ties, timbers, etc., O.K. Alignment (curve and tangent) and surface good. Track on and off, fair. Other features O.K., except some tightening needed.

Bridge 26.3.—Framed-bent trestle on piles. No waterway. Length, 150 feet; height, ½ story; number of spans, 10. Piles, 12–14 inches, with from 0 to 3 inches of rot (eighteen piles covered by slide). Four new piles needed. Bridge not gone over this year. Ties, timbers, braces, etc., O.K. Alignment (reverse spirals) and surface good. Track on and off, fair. Other features O.K., except some tightening.

Bridge 26.7.—Framed-bent trestle on M.B. and piles. Length, 240 feet; height, 2 stories; number of spans, 26. Some footings and lower parts of posts are buried. Last six bents at north partially to completely filled up. Last thirteen bents at north have pile footings. Piles, 12–14 inches, with 1 to 3 inches of rot. Three new piles needed. Ties, timbers, braces, etc., O.K. Bridge not gone over this year. Alignment (curve) and surface good. Track on and off, fair. Other features O.K., except some tightening needed.

Bridge 27.3.—Framed-bent trestle on M.B. and pile footings (twenty-four sets of M.B. covered in slide). No waterway. Length, 300 feet; height, 2 stories; number of spans, 20. Piles, 14–16 inches. Piles in last three bents had settled (are also buried in slide). This year new posts and M.B. were put in at those points as auxiliary reinforcements and the deck was shimmed; now O.K. One to 1½ inches of rot in piles, O.K. Ties, timbers, braces, etc., O.K. Alignment (curve) and surface fair. Track off south end, fair; off north end, low. Other features O.K., except some tightening needed.

Bridge 27.7.—Framed-bent trestle on M.B., except two pile-bents at north end. Length, 225 feet; height, 1 story and cripple; number of spans, 15. No waterway. M.B. footings, O.K. (one set buried). Piles, 12–14 inches, unbarked fir, with from 1 to 2 inches of rot. Three new piles needed. Ties, timbers, braces, etc., O.K. Bridge is tight. Not gone over this year. Alignment (curve) and surface good. Track on and off, fair. Other features O.K.

Bridge 28.2.—Framed-bent trestle on M.B., which are O.K. (nineteen sets buried). No waterway. Length, 420 feet; height, 2 stories and cripple; number of spans, 28. Bridge not gone over this year. Ties, timbers, braces, etc., O.K. Some tightening needed. Alignment (tangent with curve at both ends) and surface fair. Track on and off, fair. Other features O.K.

Bridge 28.38.—Framed-bent trestle on M.B., which are O.K. (nineteen sets buried). No waterway. Length, 120 feet; height, 1 story; number of spans, 8. Bridge not gone over this year. One diagonal broken; otherwise ties, timbers, braces, etc., O.K. North bulk-head shimmed 2 inches, O.K. Alignment (tangent) and surface good. Track on and off, fair. Other features O.K., except some tightening needed.

Bridge 28.4.—Framed-bent trestle on M.B., which are O.K. (Twenty-three sets buried). No waterway. Length, 135 feet; height, up to 2 stories; number of spans, 9. North bulk-head rests in crib and is shimmed 2 inches, O.K. Timbers, ties, braces, etc., O.K. Bridge not gone over this year. Needs some tightening. Alignment (curve) and surface good. Track on and off, fair. Other features O.K.

Bridge 32.5.—Pile-bent trestle across Kelly Creek. Length, 60 feet; height, 10 feet; number of spans, 4. Waterway, 4 feet wide, O.K. Piles, 12–16 inches, with from 0 to 3 inches of rot. Two piles need shims. Ties, timbers, braces, etc., O.K. Bridge not gone over this year; needs some tightening. Alignment (tangent) and surface good. No check-rails or tie-plates. Caps are hewed. Track on and off, low.

Bridge, 32.8.—Pile-bent trestle across Kelly Creek. Length, 60 feet; height, 12 feet; number of spans, 4. Waterway, creek, O.K. Piles, 12–14 inches; those in water sound; others have to 2 inches of rot. Some shims needed on centre bent piles. Caps are hewed. Ties, timbers, braces, etc., O.K. Bridge not gone over this year. Alignment (curve) and surface good. Some tightening needed. Track on and off, low. Other features O.K.

Bridge 34.8.—Pile-bent trestle. Length, 30 feet; height, 6 feet; number of spans, 2. Waterway, small creek, O.K. Piles, 12 inches; two with 1 inch of rot; others sound. Hewed caps. Ties, timbers, braces, etc., O.K. Bridge not gone over this year. Alignment (tangent) and surface good. No check-rails nor tie-plates. Track on and off, low. Other features O.K.

Bridge 35.3.—Pile-bent trestle. Length, 45 feet; height, 7 feet; number of spans, 3. Waterway, small stream, O.K. Piles, unbarked fir, 12–14 inches, O.K. Caps hewed. Ties, timbers, braces, etc., O.K. Bridge not gone over this year; needs some tightening. Alignment (tangent) and surface good. No check-rails. Track on and off, very low. Other features O.K.

Bridge 35.6.—Pile-bent trestle. Length, 30 feet; height, 5 feet; number of spans, 2. Waterway, small stream, O.K. Piles, unbarked fir, 16–17 inches, with little or no rot, O.K. Bridge not gone over this year. Ties, timbers, etc., O.K. Alignment (curve) and surface good. Hewed caps, O.K. Track on and off, low. No check-rails. Bridge needs some tightening. Other features O.K.

Bridge 40.1.—Pile-bent trestle. Length, 60 feet; height, 12 feet; number of spans, 4. Waterway, small creek, O.K. Piles, 14–16 inches, unbarked fir, have from 0 to 1 inch of rot, O.K. Hewed caps, O.K. Ties, timbers, braces, etc., O.K. Bridge not gone over this year; needs some tightening. Alignment (tangent) only fair. Surface good. Track on and off, low. Other features O.K. No plates nor check-rails.

Bridge 44.5.—Framed-bent trestle on pile footings, except bulk-head bents and first bent out from each end, which are pile-bents. Length, 255 feet; height, 2½ stories; number of spans,

17. Waterway, small creek, O.K. Bridge has been gone over this year. Piles, unbarked fir, with 0 to 3 inches of rot; size of piles, 10 to 14 inches. Twenty-two of those of small diameter and greatest rot were replaced by an equal number of new piles this year, and twenty-seven mud-block reinforcements were also put in. Bridge is tight. Ties, timbers, braces, etc., O.K. Alignment (curve) and surface fair. Track on and off, fair. Other features O.K.

Bridge 44.8.—At Clinton. Framed-bent trestle on pile footings, except bulk-head bents and first ones out from each end, which are pile-bents. Waterway, Clinton Creek, 8 feet wide, O.K. Length, 315 feet; height, 3 stories; number of spans, 21. Piles, unbarked fir, 10–14 inches, had from 0 to 3 and in a few cases 4 inches of rot. Forty-nine needed replacing and this was done during the year, as well as putting in six new M.B. One new guard-rail section was put on and the bridge was gone over and shimmed, lined, and tightened. Ties, timbers, braces, etc., O.K. Alignment (tangent and curve) and surface fair. Track off south end good; off north end, low. Other features O.K.

Bridge 48.0.—Framed-bent trestle, all on M.B., except six bents on pile footings. Mud-blocks are O.K. Piles, 10–16 inches, mostly in water (eleven have rot from ½ to 2 inches), and are O.K. Waterway, small creek, O.K. Length, 855 feet; height, up to 5½ stories; number of spans, 57. Bridge was gone over this year and lined and tightened. Ties, timbers, braces, etc., O.K. Alignment (curve) and surface good. Track on and off, fair. Other features O.K.

Bridge 49.5.—Framed-bent trestle on pile footings. Across Cariboo Road. Length, 460 feet; height, up to 2½ stories on 5-foot pile-bents; number of spans, 30, one of which is 25 feet. Waterway, none. Piles, 10–15 inches, with 0 to 2 inches of rot (a few with from 2 to 4 inches). Thirteen new piles needed. Bridge was gone over this year and tightened. Ties, timbers, braces, etc., O.K. Alignment (tangent) and surface fair. Track off south end, fair; off north end, low. Other points O.K.

Bridge 50.5.—Framed-bent trestle on pile footings. Length, 390 feet; number of spans, 26; height, 3 stories. Bridge gone over this year and lined and tightened. Needs light shimming at a number of places. Piles, 10–15 inches, with from 0 to 3 inches of rot. Three new piles needed. Ties, timbers, braces, etc., O.K. About two-thirds of length from south end there are some bents with upper story out of plumb; built that way; now braced and O.K. Alignment (curve and tangent) good. Surface slightly wavy. Track on and off, a little low. Other features O.K.

Bridge 53.8.—Framed-bent trestle on M.B. and pile footings. Length, 750 feet; height, 6 stories; number of spans, 50. Waterway, stream 10 feet wide, O.K. Riprap O.K. Eleven bents at centre and last five at north are on piles. M.B. are O.K. Piles, 10–15 inches, barked fir, with from 0 to 2 inches of rot. Some badly driven. Bridge only partially gone over this year. Guard-rail bolts tightened. Bridge appears fairly tight. Ties, timbers, braces, etc., O.K. Alignment (curve) good. Surface out slightly near centre of bridge. Track on and off, fair. Check-rail noses of poor type, but well set. Other features O.K.

Bridge 56.5.—Pile-bent trestle at Chasm. Length, 165 feet; height 8 to 10 feet; number of spans, 11. Across swamp and small creek. Waterway, O.K. Piles, 12–17 inches, barked cedar in wet ground, O.K. Bridge not gone over this year. Ties, timbers, braces, etc., O.K. Needs some tightening. Alignment (curve) and surface good. Track on and off, low. Other features O.K.

Bridge 57.6.—Framed-bent trestle on M.B., except five centre bents and bulk-head bents, which are on piles. Over Cariboo Road and the upper end of the chasm. M.B. O.K. Piles are of good size and O.K. Waterway, small creek, O.K. Length, 343 feet; height, up to 2 stories; number of spans, 23, of which two are 11 feet each and one 23 feet. Bridge not gone over this year. Is fairly tight. Ties, timbers, braces, etc., O.K. Alignment (curve) good, except near south end. Surface good. Check-rail ends poor and dangerous. Track on and off, fair. Other features O.K.

Bridge 71.5.—Pile-bent trestle across shallow lake. Length, 300 feet; height, 16 feet above water; number of spans, 20. Waterway O.K. Piles, 10–16 inches, barked fir, O.K. Bridge gone over this year and tightened throughout. Timbers, ties, braces, etc., O.K. Alignment (curve) and surface good. Check-rail noses N.G. Track low off south end. Other features O.K.

Bridge 72.0.—Pile-bent trestle across shallow lake. Length, 345 feet; height, 16 feet above water; number of spans, 23. Waterway, 280 feet wide, O.K. Bridge not gone over this year and is very loose. Has no proper anchor-bolts (some driven bolts instead). Ties, timbers,

braces, etc., O.K. Piles, 10–14 inches, barked fir, O.K. Alignment (curve) and surface good. Check-rail noses N.G. Track on and off, fair. Other features O.K.

Bridge 74.5.—Pile-bent trestle. Length, 645 feet; height, up to 18 feet; number of spans, 43. Waterway, small creek, O.K. Bridge not gone over this year. Piles, 10–14 inches, barked fir and a few cedars, O.K. Ties, timbers, braces, etc., O.K. Bridge is loose and needs a general tightening. Has no anchor-bolts at bents. Has no tie-plates and rails are spiked at every other tie only. Check-rail noses N.G. (wood-block makeshifts). Alignment (curve) only fair. Surface good. Track on and off, fair. Other features O.K.

Bridge 99.8.—Framed-bent trestle on piles across Little Bridge Creek. Length, 900 feet; height, up to 3 stories on 6 pile-bents 10 to 12 feet high at creek. Waterway, creek, O.K. Piles, 10–14 inches, barked fir, O.K. Bridge not gone over this year. Some tightening needed. Ties, timbers, braces, etc., O.K. Alignment (curve) and surface good. Check-rail noses N.G. Track on and off, fair. Other features O.K.

Bridge 138.0.—Pile-bent trestle. Length, 150 feet; height, 17 feet; number of spans, 10. Waterway, stream 16 feet wide, O.K. Piles, barked fir, O.K. Bridge not gone over this year. Ties, timbers, braces, etc., O.K. Alignment and surface good. Some tightening needed. Track on and off, good. Check-rail noses N.G. Bulk-head fill at south end poor. Other features O.K.

Bridge 138.34.—Pile-bent trestle. Length, 60 feet; height, 7 feet; number of spans, 4. Waterway, stream 20 feet wide, O.K. Piles O.K. Ties, timbers, braces, etc., O.K. Bridge not gone over this year. Needs some tightening. Alignment and surface good. Track on and off, low. Check-rails very short and noses N.G. No water-barrels. Other features O.K.

Bridge 138.41.—Pile-bent trestle. Length, 75 feet; height, 16 feet; number of spans, 5. Waterway, stream 18 feet wide, O.K. Piles O.K. Ties, timbers, braces, etc., O.K. Bridge not gone over this year. Needs some tightening. Alignment (tangent) and surface good. Track on and off, low. Check-rails very short and noses N.G. No water-barrels. Other features O.K.

Bridge 138.48.—Pile-bent trestle. Length, 90 feet; height, 18 feet; number of spans, 6. Waterway, stream 18 feet wide. Piles, barked fir, O.K. (some on small side). Bridge not gone over this year. Ties, timbers, braces, etc., O.K. Some tightening needed, also shimming. Alignment (tangent) and surface good, except at one point, which needs shimming. Track on and off, low. Check-rails very short and noses N.G. Other features O.K.

Bridge 140.0.—Should be 139.99. Framed-bent trestle on pile footings. Length, 480 feet; height, 3 stories; number of spans, 32. Waterway, small creek, O.K. Piles, barked fir, many of which are on small side and badly driven, O.K. Bridge was gone over this year and was lined and shimmed and a number of M.B. were put in. Alignment (tangent) and surface good. Track on and off, low. Check-rail noses N.G. Other features O.K.

Bridge 144.39.—Pile-bent trestle over roadway. Length, 75 feet; height, 18 feet; number of spans, 5. Waterway, none. Piles, 9–10 inches, barked fir, O.K. Bridge not gone over this year and needs some tightening. Ties, timbers, braces, etc., O.K. Alignment (tangent) and surface good. Track on and off, low. No water-barrels. Check-rail noses N.G. Other features O.K.

Bridge 145.75.—Pile-bent trestle. Length, 90 feet; height, 15 feet; number of spans, 6. Piles, 10–14 inches, barked fir, O.K. Bridge not gone over this year and needs some tightening. Ties, timbers, braces, etc., O.K. Alignment (tangent) and surface good. Track on and off, very low. No water-barrels. Waterway dry, O.K. Check-rail noses N.G. Other features O.K.

Bridge 155.28.—Framed-bent trestle on pile footings across Williams Lake Creek at Williams Lake material-yard. Length, 345 feet; height, 1 story; number of spans, 23. Pile footings O.K. Waterway, creek 100 feet wide, O.K. Bridge was not gone over during the year and needs attention soon. Out of line and surface and needs tightening. Ties, timbers, braces, etc., O.K. Track on and off, low. Other features, O.K.

The above completes the bridges on the Lillooet Subdivision (156 miles). Besides the work on the foregoing bridges, the B. and B. did a considerable amount of work in the way of loading and unloading and distributing materials for the various bridges.

Supplementary, 1922.—The repairs referred to as being necessary are being carried out.

Williams Lake Subdivision—Williams Lake to Quesnel (70 Miles).

This portion of the line was completed and turned over for operation on October 22nd, and no opportunity to inspect the bridges on same was possible on account of my time and attention being taken up with repairs due to wash-outs on the Squamish Subdivision; nor have these bridges been gone over by our B. and B. gang.

These bridges were gone over by the Northern Construction Company's gang shortly before they were turned over. Some of them, especially those in the north near Quesnel, are on bad ground and are out of line and surface and badly in need of attention.

Shortly after the October floods arrangements were made with Assistant Engineer Bright, of Quesnel, under whose supervision the construction of that portion of the line was done, to look after the maintenance in the Quesnel District until such time as I would again be able to take it over. As soon as weather conditions permit an examination of these bridges will be made and a report, supplementary to this one, will be sent to you.

Supplementary, 1922.—The bridges on this subdivision are in good condition. Bridge 159 may, however, give further trouble, although the foundations have been reinforced. Additional rock-filling will have to be placed this fall in the south abutment and river piers of the bridge across the Quesnel River.

Cribbing.

The inspection of all cribs was rendered impossible this year on account of lack of time, having been fully occupied with repair-work, following the floods, at the time when the annual inspections are usually made. This inspection will be made as early in the coming spring as the weather and other circumstances permit.

These cribs and log walls are for the most part rock-filled, and where such is the case previous inspections showed that deterioration is taking place but slowly, and in those cases no immediate trouble is anticipated. This applies particularly to the cribs along Anderson and Seton Lakes, except the one at Mile 110, and to those north of Mile 6, Lillooet Subdivision.

The crib at Mile 110 is dirt-filled and is nearing its limit of usefulness. It is being closely watched, Section Foremen being under instructions to that effect. The cribs between East Lillooet and Mile 6, also dirt-filled, are ageing rapidly and are also under surveillance. Many of these cribs were constructed for the purpose of preventing the slopes from running, and in most other cases the track is well back and not bearing directly upon the cribs.

Some of these cribs have been repaired during the year, some have been renewed entirely, and some new ones have been built, as noted below, the work having been done by our B. and B. gang.

As anticipated a year ago, some of these cribs required repairs, and this was done. Two new double cribs 12 feet high and 71 and 60 feet long, respectively, and one 5 to 20 feet high and 60 feet long were put in in the vicinity of Mile 3.5 Below the bridge at Mile 1.7 a crib 9 feet high, 25 feet long; a crib 7 feet high, 48 feet long; a crib 4 feet high, 58 feet long; and a double crib 5 feet high, 86 feet long, were built. At the same point 1½ feet in height was added to a crib 28 feet long and 6 feet to a crib 32 feet long.

Three cribs, one above the other, to protect the bank, slope, and foundation of an approach-bent, were put in on the down-stream side of the north abutment of the Fraser River Bridge at Lillooet. Deadman anchors were put in and two car-loads of rock were used for filling. The sizes of these cribs are 5 by 54 feet, 5 by 35 feet, and 4 feet 6 inches by 35 feet. At the same bridge this gang put in twenty-three cars of heavy riprap at the north abutment and around the first, second, and third piers south of that abutment.

The water-logged condition of the ground, following the heavy storm of October 27th and 28th, caused the failure of a series of cribs, one below the other, a short distance south of Mile 4 (commonly referred to as Mile 3.5), Lillooet Subdivision. This has been referred to elsewhere in this report under the heading of "Damage to Road-bed and Structures."

Further work in the way of renewals and repairs to cribs as outlined in my report a year ago will be necessary as early in the coming spring as conditions permit.

Material was hand-logged and two double cribs, 10 by 170 and 10 by 80 feet were built by the same gang in the vicinity of Mile 54, Squamish Subdivision. Other cribs were built by the Northern Construction Company, as noted elsewhere.

River-protection Work.

Very little new work was undertaken this year in the way of river-protection until after the October floods. Aside from the riprapping around the Fraser River Bridge, mentioned elsewhere, some riprapping was done at the south approaches of Bridges 118.1 and 69.6, also at a number of points along Anderson and Seton Lakes, at Cheakamus, and at Mile 10, near Cheekye.

The river-protection cribs along Anderson Creek and the Birkenhead River, built some two years ago, are all in place and doing splendid work. All of them withstood the unprecedented fall floods, and it is noteworthy that no damage to road-bed occurred along these streams, which before the building of these cribs were a constant source of trouble and expense. A number of these cribs were undermined or partially tipped over, but the flexible construction, as intended, allowed the cribs to settle and plug the wash-out, settlement being coincident with the scouring. Where this occurred the cribs have more or less the appearance of being somewhat wrecked or done for, but that such is not the case is proven by others which were similarly affected a year ago and which came through the recent floods intact and having performed their work as well as ever. A detailed inspection of these cribs will be made in the spring and such repairs as may be necessary will be made.

As the result of rivers and creeks forming new channels during the recent floods a number of new deflection and training-wall cribs will have to be built at various points between Cheakamus and Owl Creek as soon as weather conditions permit. It is impossible at the present time to give any details of same, as those points are frozen up and snowed in. Roughly, they are as follows: Two at Cheakamus; a training-wall at Mile 23; at least two small ones at Bridge 43.5 on Wedge Mountain Creek; three, and possibly four, on 1-Mile Creek, Pemberton; one on Owl Creek; one on the creek at Bridge 69.6; and three, or possibly four, on Cheekye Creek. Two cribs, one on the creek above the new bridge at Mile 35.4 and the other on Green River at Mile 44, built recently by the Northern Construction Company, have not yet been filled with rock and brush. They will have to be filled in the spring. Three training-wall cribs at Mile 54, built by our B. and B. gang and the Northern Construction Company, are completed and filled, while one built by the latter near Mile 20 is only partially built and filled.

In connection with permanent repairs to the road-bed, varying amounts of riprapping will have to be done at the following points: Mile 4.1; Mile 9.7 (Cheekye); Mile 12 (Cheakamus); Mile 20; Mile 23; Mile 27.2; Mile 43.5; Mile 54 and vicinity; and at a number of other points of minor importance.

Damage to Road-bed and Structures, caused by October–November Floods.

The latter part of October was a period of very heavy and almost continuous rains, which kept the coastal rivers and creeks in the Howe Sound District in a constant state of flood. Aside from some damage to our road-bed at Cheakamus, no serious damage resulted until, as noted elsewhere, the Squamish Dock was wrecked, due to the piling being scoured out.

During the night of the 27th and all day of the 28th there occurred the most violent downpour, with almost the intensity of a cloudburst, that has been known in this district. This was accompanied by a Chinook wind which rapidly melted a heavy fall of new snow in the hills and mountains. This was the same storm which wrecked the town and caused the loss of so many lives at Britannia Beach, some 6 miles from Squamish, and also washed out the Canadian Pacific Railway, Canadian National Railway, and Great Northern Railway at many points.

By the evening of the 28th the Cheakamus and Mamquam Rivers, already swollen to capacity, had overflowed their banks and the whole delta of the Squamish, except the lower area of the townsite of Squamish, was flooded. The peak of the flood occurred about 2 a.m. on the morning of the 29th, at which time the depth of water in the upper portion of the townsite was 4 to 5 feet, causing a large amount of damage to private property, roads, sidewalks, and personal effects. Fortunately no lives were lost. The dykes and intervening slough saved the lower portion of the town, in which most of the company's improved property is situated, and no damage occurred at that point.

This storm covered the whole Lower Mainland and reached, in diminishing degree, as far north as Williams Lake. The greatest damage to the Pacific Great Eastern Railway, as noted in detail below, took place between Squamish and Pemberton; that is, over a distance of some 57 miles. Between Pemberton and Lillooet there were a number of minor wash-outs and small slides. At points between Lillooet and Lough Raymond some sliding cuts and the failure of a series of old log cribs at Mile 3.5, E.L.N., gave us some trouble. Beyond Lough Raymond there was no trouble.

The following is a brief statement of the damage done at various points along the line:—

Squamish to Mile 3.5 (the shops): Many small wash-outs on both legs of the wye and on the main line between Pemberton Road and the trestle at the south end of the new yard.

Temporary repairs effected by local section and B. and B. gang, with assistance of such other available labour as could be obtained. Underpinning of section-house at shops, damaged by flood. Repaired by B. and B. gang. The shops and new yards, being on built-up ground, were not damaged to speak of.

Mile 3.5 to Mile 6 (Brackendale water-tank): Many small wash-outs of ballast and road-bed and one wash-out of road-bed and ground, about 10 feet deep and 20 feet long, at Mile 4.15. A 15-foot open culvert span was put in at that point, but a second flood some ten days later took culvert and span out and enlarged the opening to about 13 feet deep by 80 feet long. Repaired by the building of a pile-bent trestle. This structure was put in by our B. and B., and was ready for the passage of trains in two and a half days. Other repairs in this section were made by the same crews mentioned in the preceding paragraph. From Squamish to Mile 6 the main line was submerged, except where it passes through the new yards, and when the water subsided the track was found to be more or less blocked throughout by driftwood and debris.

At Mile 9.7 (Cheekye River) three 30-foot spans of the bridge were wrecked by the undermining of piers and footings, and 130 feet of the road-bed adjoining the south end of the bridge was washed out to a depth of about 12 feet. Repairs and a new span 125 feet long are under way by the Northern Construction Company. Trains are being passed through on the falsework.

At Mile 11 there were two small wash-outs, both of which were repaired by our own gangs.

At Cheakamus, Mile 12, the whole main line road-bed, from near the south switch to a point near the station, was washed out. The track was thrown over by our gangs, but upon further damage by the second flood the siding was connected up at the north end and traffic is now being routed over same, pending completion of repairs in the spring. The work of repairing and opening the line at this point was done by our own and Northern Construction Company gangs.

In the vicinity of Mile 20, near the upper end of the Cheakamus Canyon, the river tore out about 80 feet of the dump from under the track. On account of the conformation of the canyon-walls and winter conditions this point was one of the most difficult to repair. Further work will have to be done at this point in the spring. Repairs were by the Northern Construction Company.

Just south of Watson south switch, at the head of the Cheakamus Canyon, the river tore out from under the track, what had always appeared to be solid rock, portions of the road-bed at three points. The lengths of these damaged portions varied from 20 to 30 feet. Repairs were made by the Northern Construction Company.

At Mile 23 (Daisy Lake): The road-bed, a rock-dump about 25 feet high, was entirely carried away for a distance of about 900 feet. Repairs were made by the Northern Construction Company and further work will have to be done in the spring.

A short distance north of Mile 27 the toe of the embankment was damaged. This will have to be repaired in the spring.

At Mile 35 a large rock and dirt slide blocked the line. This was opened up by our Mons section-gang. More material will come down at this point when the spring thaws set in.

A double culvert at Mile 35.4 was entirely too small to carry the flood-waters at that point, resulting in the washing-out of 105 feet of road-bed to a depth of 8 to 10 feet. Temporary repairs in the nature of a trestle were made by our B. and B. gang. Permanent repairs consisting of a rock-fill, protection-cribs, and a 15-foot open-span culvert were made by the Northern Construction Company. A new protection-crib up-stream will have to be rock-filled in the spring.

The dump at the north bulk-head of a small bridge near Mile 43 was damaged and will need permanent repairs in the spring. Temporary repairs were made by the Northern Construction Company.

Wedge Mountain Creek, Mile 43.5, became jammed with logs and trees and formed a new channel about 60 feet wide, just south of the south abutment, and 10 feet deep. One 30-foot span of the bridge was also damaged. A temporary trestle was put in by our B. and B. gang. This has been partially replaced by a permanent rock-fill put in by the Northern Construction Company. The latter company is at present framing a 60-foot truss for this point. The completion of the rock-fill approach and the construction of two or three protection-cribs will be necessary in the spring.

Practically the whole road-bed, a fill 5 or 6 feet high, between Mile 44 and the Green River Bridge, was taken out for a distance of 500 feet. This was caused by the Green River leaving its old channel, which had become blocked by a log-jam. Permanent repairs in the nature of a new fill and a protection-crib were made by the Northern Construction Company. The river-protection crib will have to be rock and brush filled in the spring.

At the entrance to the Green River Canyon, Mile 49, a hand-laid rock-fill was taken out where the track passes around the face of a high rock bluff. The face of this bluff had to be shot down in order to get a solid foundation for the road-bed. This work was done by the Northern Construction Company. Some further trimming may be necessary in the spring.

Between Mile 54 and the Green River Falls the line was gutted at intervals, interspersed with slides from the clay and boulder hillside. Repairs here to date have consisted of throwing the track into the hillside, the partial rebuilding of the road-bed, and the construction of a number of protection toe-cribs. Further work will be necessary in the spring The work was done by the Northern Construction Company, assisted for a time by our B. and B. gang.

At Pemberton, just north of Mile 57, 1-Mile Creek became jammed with logs, jumped its banks, and took out the north leg and tail of our wye. It also caused some minor damage to the main line between the wye and the water-tank. Repairs here consisted of the building of a new wye on the opposite side of the track. This work, except the track-laying, was done by the Northern Construction Company. The jams in 1-Mile Creek will have to be cleaned out in the spring and some river-protection cribs put in.

At Owl Creek, Mile 64.4, there were two wash-outs, one 35 feet long and 10 feet deep and the other about 300 feet long and from 1 to 2 feet deep. Repairs at this point by means of tie-cribs, blocks, and logs were made by the B. and B. gang. This work should be made permanent in the spring.

Some scouring took place at the south approach to Bridge 69.6. This was repaired by the B. and B. gang.

Between the above point and Lillooet, Mile 120, there were many small wash-outs, slides, and jams, etc., too numerous to mention and not particularly noteworthy. These repairs and the clearing of the line were done by the B. and B. and local section gangs.

North of Lillooet to as far north as Kelly Lake, Mile 33, E.L.N., there were a number of slides. These slides took place for the most part at the following points: Between Mile 3.5 and Mile 6; between Miles 8 and 10; and between Miles 22 and 33. The clearing of these slides was done by our own gangs. Due to the water-logged condition of the ground at Mile 3.5 a series of old slope-protection cribs gave way, causing the slope to slide. The track was thrown into the bank and a pile trestle will be built at this point as soon as the condition of the ground permits. This is very hard ground to hold and new slope-protection cribs may ultimately be required. As noted above, no material damage occurred north of Kelly Lake.

Repairs to Road-bed and Structures, due to October-November Floods.

Immediately after the flood our own limited forces, composed of the B. and B. gang, extra gang, local section-gangs, and such other labour as could be obtained, under the combined direction of Roadmaster Tuck and B. and B. Master Dillon, were put to work repairing minor damages to the extent of allowing gas-cars to get through with materials, tools, and supplies, and work-trains from both ends to get to points as far into the damaged district as possible, which from the Pemberton side was, for work-trains, as far south as Mile 55 and from the Squamish side north as far as the Cheekye Bridge at Mile 9.7. Gas-cars could get through from Squamish to Mile 23, where a transfer of 900 feet was made to cars which could reach that point from Pemberton and points north of there.

In making this trip by gas-car, which for some time was the only means of taking men, materials, and supplies to the various points where repair-gangs were at work, suspended track ranging in length from 20 to 130 feet in length had to be crossed at eleven points. Supplies were brought in this manner from both Squamish and Lillooet, all available gas-cars along that portion of the road being pressed into this service for a matter of some three or four weeks. During the latter part of that time these cars, equipped with improvised snow-ploughs, bucked snow to a depth of 2½ to 3 feet. Too much credit cannot be given to the operators of these cars in keeping the line open and in getting supplies through, thereby enabling the work to be pushed to completion. These men were out in all kinds of weather and to all hours of the night.

In the meantime arrangements had been made with the Northern Construction Company, Limited, to take over the work of reconstructing the damaged portions of the line. By the end of the first week in November nine camps or boarding outfits were established between Cheekye and Pemberton. These camps and outfits housed thirteen gangs, the total number of men averaging from 160 to 170.

Our B. and B. and extra gangs cleared the line between Lillooet and Mile 55. Along this portion there were a number of points where minor repairs were necessary, and at Owl Creek there were two wash-outs of considerable proportions which were temporarily repaired for the passage of trains by cribbing up with logs and ties.

Between Squamish and Cheekye there were ten small wash-outs which were temporarily repaired by blocking, filling, and the construction of a new pile trestle 75 feet long and 13 feet high. Between Cheekye and Cheakamus there were two small wash-outs, repaired by blocking and filling. At Cheakamus the track was thrown away from the badly scoured river-bank, some riprapping was done, and the old siding was repaired and reconnected at the north end to allow the passage of trains through the same. All of the work mentioned in this paragraph was done by our gangs, composed of B. and B. men, sectionmen from Squamish and Cheakamus, and such local labour as could be picked up.

The direction of our forces on the Pemberton end was under Roadmaster Tuck and at the Squamish end under B. and B. Master Dillon. As soon as the Northern Construction Company got under way our forces, with the exception of sectionmen, were placed at the disposal of the Construction Company in order to expedite the work. This arrangement worked admirably and was maintained until the beginning of December, when, the line being open, our B. and B. gangs were withdrawn and put back to their regular duties. The work done by the Northern Construction Company was under the direction of Superintendent Flesher, of that company.

At Cheekye, where 130 feet of the road-bed was taken out to a depth of 12 feet and 90 feet of the bridge destroyed, a temporary pile trestle was put in, being so constructed that a portion of it could be used as false-work for a 125-foot Howe-truss span. This was completed for the passage of trains at the end of November and work in connection with building the truss was begun. This work is now under way and will be carried through to completion. Other work to be done at this point consists of bucking up a quantity of logs and trees lodged on the up-stream river-bed, diverting the stream to somewhat its old bed, and the installation of three, and possibly four, river-protection cribs. This latter work should be done early in the spring.

At Cheakamus a gang was put to work riprapping the river-bank, but has since been laid off, it being deemed advisable to leave this work until spring.

At Mile 20 about 80 feet of road-bed that went out was repaired to the extent of being passable under slow orders. The situation here presented some difficulty. This point is in the Cheakamus Canyon and time and topography both prevented anything in the nature of a trestle or span. A rock and dirt fill was made. A toe-crib was built at the bottom to prevent the fill slipping out. Logs laid in the top of the fill supported the track. This work was done under most adverse conditions, nearly as much snow having to be shovelled as other material handled. More filling is required and more height to the crib, but on account of weather and other conditions it has been decided to discontinue work at this point until later.

Between Mile 20 and Watson Siding three wash-outs were repaired by making rock-fills and throwing the track in. The work left to be done at this point in the spring consists of lining and surfacing.

At Mile 23, where 900 feet of the high rock-fill was taken out completely, a temporary grade and track was put in, hugging the rock bluff closely. From the face of this bluff material was obtained with which to rebuild the fill. As fast as this work progressed the track was thrown out on to the new work. As in the case at Mile 20, work has been stopped for the present. It should be completed in the spring. Other work to be done consists of the building of a training-wall crib whose exact position and extent it will be impossible to determine before the snow goes off.

At Mile 35 our Mons section-gang opened the line through a rock and dirt slide. More work will have to be done at this point, as all that is preventing more material from sliding in is the frost.

At Mile 35.4, where 105 feet of the road-bed to a depth of 8 to 10 feet went out, a temporary framed trestle from material cut in the woods alongside was put in. Later this was rock-

filled, except for a 15-foot span supported at each end by rock-filled log cribs with wings. Two hundred feet of protection-crib was built, but not filled, up-stream to replace the old crib which was destroyed. The filling of this crib and some track-surfacing will have to be done in the spring.

At Mile 43.5, where Wedge Mountain Creek left its bed and took out 60 feet of road-bed to a depth of 8 to 10 feet and damaged the bridge, a temporary framed trestle of material cut close by was put in. Later this was partially filled. Permanent repairs will be in the nature of a 60-foot Howe-truss span. This work will be taken in hand by the Cheekye gang as soon as it is through with the span at that point. Other work remaining to be done in the spring is the diverting of the stream, bucking up of drift, and the building of two or three small river-protection cribs in the spring.

At Mile 44, where 500 feet of dirt-fill was taken out by the Green River, a rock-fill was made and a river-protection crib was built but not filled. This crib will have to be filled in the spring and about 600 feet of track-surfacing done.

At Mile 49, which is in the Green River Canyon, where the original old hand-laid rock-fill was taken out, the face of the rock bluff had to be shot down and the track thrown in, the material shot down being used for fill and riprap. Obstructing boulders and a point of rock on the other side of the canyon, which were throwing the river against us, were shot out. Some slope-trimming may be necessary and lining and track-surfacing will have to be done in the spring.

From Mile 54 to the Green River Falls the road-bed was badly gutted. Here it was necessary to build three extensive toe-cribs and to excavate into the boulder, rock, and clay hillside in order to get room to throw the track and at the same time obtain material with which to rebuild the road-bed. While a large amount of work was done at this point, there remains a considerable amount to be done in the spring before this point is in satisfactory condition.

At Pemberton, where the wye was destroyed, a new wye was laid out on the opposite side of the track. This has just been completed ready for track-laying and the building of two small culverts. Weather conditions are such that it is inadvisable to complete this work before spring. After the track is laid some filling will be necessary on and near the tail. The work to be done at 1-Mile Creek is the removal of the jam above the bridge, the blocking of three flood-channels, and the installation of some river-protection works, the extent of which it is impossible as yet to determine on account of the snow and ice.

A small amount of filling and the blocking of a flood-channel will have to be done at Owl Creek, where temporary repairs, as noted elsewhere, were made.

At Mile 3½ north of Lillooet, where the cribs went out, the track was thrown in, but nothing further has been done. A pile trestle will be built at this point as soon as weather conditions permit, the ground at present being frozen tight.

The tabulation of costs of the foregoing work is not yet complete. These will be sent in in due course. The weather conditions for the greater part of the time were most adverse and the cost was therefore higher than it would have been at any other time of the year. This has been a controlling factor in shutting down the work at this time.

Trains from the north and south met at Mons on the afternoon of November 30th, and the first passenger-train went through on December 2nd, being the first through after the annulling of No. 1 on October 28th. It is only in the last few days that our heaviest engines have been put in service again over this portion of the road.

Repairs on Account of Flood Damage (Supplementary, 1922).

Mile 2, eighteen cars earth. Mile 3.6, six cars rock. Mile 4, twenty cars rock. Mile 4.3, ten cars rock. Cheekye, Mile 9.7, bridge of 120-foot span completed; two piers half-filled and fifty-two cars rock and channel work. Mile 10, ten cars rock. Along Cheakamus, 144 cars rock. Mile 20 to 20.5, eighty-nine cars rock. Crib, 10 by 12 by 80, finished and filled. Mile 23, 204 cars rock. Mile 27, fourteen cars rock. Mile 35, fourteen cars rock and gravel; three cribs, 6 by 6 by 76, 6 by 6 by 72, and 5 by 6 by 200, lost, unfilled; also 15-foot span. Mile 43, completed bridge, 60-foot span; seventy-four cars rock and channel work. Mile 44, fifty-three cars gravel and thirty-two rock. Crib, 6 by 8 by 200 unfilled and damaged. Mile 49, sixteen cars rock. Mile 54, 364 cars rock; three cribs all filled, 12 by 10 by 170, 12 by 10 by 80, and 14 by 10 by 50. Mile 57, fifty-four cars ballast, laid new wye, old taken up, log-jam

removed, and 500 feet rock and log training-wall. Mile 64, log and tie blocking still in place. Foregoing points all lined and surfaced. Small repairs at many points. Telephone-line under repair. Piles driven for bridge at 3.5, Lillooet.

(*c.*) CONSTRUCTION, 1921.

(1.) *Chasm to Cottonwood.*—Ballasting had been completed to Deep Creek and track had been laid to Australian Creek in 1920. During January, February, and March only, mill and logging operations were carried on. In April ballasting operations were started from the Soda Creek Pit; in the meantime bridge-erection from Australian Creek to Cottonwood was put under way and carried out continuously throughout the year, seventeen bridges being erected, containing 1,763,000 F.B.M.

In the middle of June it was possible to start to lay track, and this was done and the Cottonwood Crossing reached on August 24th; a total distance of 37 miles of main line track having been put down, sidings and yards and wyes being addition.

Ballasting followed the track-laying and was carried to within 2 miles of the Cottonwood Crossing before closing down for the season.

A steam-shovel and several outfits of men were employed during the whole season, both behind and ahead of the track, clearing out slides and regrading about 8 miles of line. Some of these slides were bad, particularly those at Soda Creek, 6-Mile Creek, and the slide about 3 miles north of the town of Quesnel.

There were also erected station buildings, section-houses, tanks, a small two-stall engine-shed, and other buildings.

(2.) *Prince George South to Red Rock Siding.*—About the middle of October the track-laying outfit was moved from the Cottonwood Crossing to Prince George, and track-laying immediately proceeded with and Red Rock Siding, 17.5 miles south from Prince George, reached in December, when work was suspended.

In addition to the above work, three bridges, which were partially finished in 1920, were completed and four additional structures were erected; the total number of feet board measure in these bridges amounted to 1,260,000.

Supplementary, 1922.

Chasm to Cottonwood and Prince George South.—In 1922 the only new construction carried out was the placing of the second 150-foot span across the Quesnel River and partially rock-filling the piers and abutment of this bridge. Some slides developed on certain sections of the line south of the town of Quesnel, and on these it was necessary to do some additional grading, to change the line at Bridge No. 160, and rebuild the same. Some strengthening in the foundations in Bridge No. 159 was found necessary to carry out. This is now complete.

A list of certificates issued during the year is given in Appendix A.

Accidents which have occurred on railways under the jurisdiction of this Department and reported as required by the Act are given in Appendix B.

A list of the railways incorporated under Acts of the Legislature of British Columbia since 1883 is given in Appendix C.

A list of railways (common carriers and industrial) operating under the Department's jurisdiction is given in Appendix D.

I have the honour to be,

Sir,

Your obedient servant,

A. F. PROCTOR,

Chief Engineer.

APPENDICES.

APPENDIX A.

CERTIFICATES, 1921.

	Cert. No.
Dolly Varden Railway—	
Authority to carry traffic over portion of railway	454
Kettle Valley Railway, Copper Mountain Branch—	
Authority to carry traffic over the Copper Mountain Branch (controlled by Federal authorities)	455
Pacific Great Eastern Railway—	
Increase in express rates	455A
Local Return Passenger Tariff	456
Grouse Mountain Scenic Incline Railway Co.—	
Extension of time to April 1st, 1923	457
Pacific Great Eastern Railway Co.—	
Express Tariff	458
Special Commodity Tariff on Potatoes	459
Local Interurban Passenger Tariff	460
Local Joint and Proportional Freight Tariff	461
Special Commodity Tariff on Box-shooks	462
Special Commodity Tariff on Box-shooks	463
Express Tariff	464
B.C. Electric Railway Co., Ltd.—	
Standard Maximum Freight Mileage Tariff	465
General Rules and Regulations—	
Speed of Electric Railways in B.C.	465A
Pacific Great Eastern Railway Co.—	
Local Joint and Proportional Freight Tariff	466
B.C. Electric Railway Co.—	
Freight and Express Tariffs	467
Freight and Express Tariffs	468
Pacific Great Eastern Railway Co.—	
Special Commodity Tariff on Potatoes	469
Special Mileage Tariff on Sawlogs	470
Special commodity rate on lumber, etc., for export	471
Special Commodity Tariff on Apples	472
Spur track of Corporation of the City of North Vancouver crossing tracks of P.G.E.	473
Rules and Regulations for the Operation of Electric Railways—	
Making application before changing from two-man operation to one-man	474
B.C. Electric Railway Co.—	
Operation of one-man cars	475
Pacific Great Eastern Railway Co.—	
Permission to operate from Williams Lake to Quesnel	476
B.C. Electric Railway Co., Ltd.—	
Standard Freight Mileage Tariff	477
Industrial spur track on Queens Avenue, New Westminster	478

APPENDIX B.

ACCIDENT REPORT, 1921.

Persons injured.	Result.	Cause,
Comox Logging & Railway Co.		
1 trainman	Bruised hips and abdomen	Ends of logs running together when train stopped.
2 trainmen	Killed	Locomotive boiler exploded.
1 trainman	Scalded	,, ,,
Crow's Nest Southern Railway.		
1 trainman	Cut under left eye	Cage not clearing diamond.
1 trainman	Cut on right cheek	,, ,,
1 section foreman	Killed	Deceased lying in centre of track face downward, engine ran over him. Coroner's verdict, accidental death.
2 labourers	Burns about head, face, and hands	Explosion of kerosene-lamp.
1 man	Left leg broken	Trespasser deaf and dumb; stepped in front of motor-car.
1 section labourer	Scalp-wound	Jumping from motor-car to avoid collision.
1 carpenter	Fracture of left tibia	Axe flew off handle.
1 section foreman	Steel in eye	Driving spike.
1 section labourer	Bruised chest, hip, and left arm	Collision of two motor-cars.
1 section foreman	,, ,, ,,	,, ,,
1 fire patrolman	Left wrist sprained	,, ,,
1 section foreman	Left leg broken	Motor-car left track.
1 carpenter	Right leg broken and arm bruised	Loosening bents, one falling too soon.

APPENDIX C.

RAILWAYS INCORPORATED UNDER ACTS OF THE LEGISLATURE OF BRITISH COLUMBIA SINCE 1883.

Name of Railway.	Chap.	Year.	Remarks.
Adams River Rly.	30	1903	Lapsed.
Alice Arm Rly.	46	1898	,,
Ashcroft & Cariboo Rly.	40	1890	,,
,,	60	1890	,,
,,	52	1891	,,
,,	52	1896	,,
Ashcroft, Barkerville & Ft. George Rly.	49	1906	,,
Arrowhead & Kootenay Rly.	47	1898	,,
,,	65	1901	,,
Atlin Short Line Rly. & Navigation Co.	79	1899	,,
Atlin Southern Rly.	80	1897	,,
Barkerville, Ashcroft, & Kamloops Rly.	46	1897	,,
Bedlington & Nelson Rly.	47	1897	Declared for public benefit, c. 53, 1899.
Bedlington & West Kootenay Rly.	46	1893	Lapsed.
Bentinck Arm & Quesnel Rly.	48	1907	,,
Bella Coola & Fraser Lake	50	1906	,,
British Columbia & Alaska Rly.	56	1910	,,
British Columbia & Northern	32	1903	,,
Mackenzie Valley Rly.	53	1906	,,
British Columbia Central	51	1906	,,
,,	57	1910	,,
British Columbia Northern & Alaska Rly.	52	1906	,,
British Columbia Southern	36	1893	Amended, c. 47, 1893; repealed c. 53, 1894; c. 39, 1894; c. 4, 1896; c. 53, 1896; c. 33, 1897. Declared for public benefit, c. 36, 1897.
British Columbia Electric Rly.—			
Vancouver Street Rly.	31	1886	Lapsed.
,,	38	1889	Incorporation.
Vancouver Electric Rly. & Light Co.	51	1890	Amendment.
National Electric Tramway & Light Co.	39	1899	Victoria Electric Rly. & Light Co., c. 62, 1894.
Ditto.	52	1890	Amendment.
Westminster Street Rly.	65	1890	
Westminster & Vancouver Tramway Co.	67	1890	Amended.
British Columbia Electric Co.	49	1890	
,,	71	1891	Act to amalgamate Westminster Street Rly. & Westminster & Vancouver Tramway Co.
,,	....	....	
,,	51	1894	Amended. Land grant.
Consolidated Rly. & Light Co.	56	1894	Incorporation.
,,	55	1896	Amendment.
Victoria Electric Rly. & Light Co.	63	1894	City of Victoria to supply light and power.
Victoria & British Columbia Electric Rly. Co. Agreemene	81	1897	Supply electric light and power in and around City of Victoria.
British Columbia Yukon Rly. Co.	49	1897	Operating.
Burrard Inlet & Fraser Valley Rly.	54	1891	Amended, c. 48, 1893, and c. 59, 1895. Lapsed.
Burrard Inlet Rly. & Ferry Co.	53	1891	Lapsed.
Canadian North-eastern Rly.	74	1911	,,
Canadian Northern Rly.	48	1892	,,
,,	3	1910	*Main Lines.*—Agreement.
Canadian Northern Pacific Rly.	4	1910	(*a.*) Yellowhead Pass to Vancouver, completed; (*b.*) Victoria to Barclay Sound, time extended to July 1st, 1917.
,,	32	1912	Barclay Sound to Nootka Sound, time extended to July 1st, 1917.
,,	57	1913	*Branch Lines.*—(*a.*) Westminster Bridge to Vancouver, time extended to July 1st, 1917; (*b.*) Westminster Bridge to Steveston, time extended to July 1st, 1917; (*c.*) Victoria to Patricia Bay, completed.

APPENDIX C—*Continued.*

RAILWAYS INCORPORATED UNDER ACTS OF THE LEGISLATURE OF BRITISH COLUMBIA—*Continued.*

Name of Railway.	Chap.	Year.	Remarks.
Canadian Northern Pacific Rly.	58	1913	Amendment to c. 4, 1910.
„	59	1913	*Terminals.*—Port Mann, New Westminster, Vancouver, Victoria, Steveston, and Patricia Bay.
„	61	1914	Further aid towards construction.
„	62	1914	Amendment to c. 57, 1913. Declared for public benefit, Order in Council, February 20th, 1917.
Canadian Pacific Rly.	11	1880	Land grant.
Canadian Western Central Rly.	20	1889	Land subsidy.
„	34	1889	Incorporation. Amended, c. 40, 1890; c. 36, 1892; c. 39, 1893; c. 4, 1895; c. 35, 1897. Lapsed.
Canadian Yukon Rly.	50	1898	Lapsed.
Cariboo, Barkerville, & Willow River Rly.	62	1910	„
Cariboo Rly. (Ashcroft & Cariboo)..	55	1897	Amendment, c. 50, 1897. Lapsed.
Cassiar Central Rly.	35	1897	Crown grant.
„	52	1897	Incorporation. Lapsed.
Chilkat & Klehine Rly. & Navigation Co.	68	1901	Lapsed.
Chilliwack Rly.	55	1891	Declared for public benefit, c. 43, 1893. Not built.
Columbia & Carbonate Mountain Rly.	61	1890	Lapsed.
Columbia & Kootenay Rly.	21	1889	Land subsidy.
„	62	1890	Amended, c. 49, 1892; c. 60, 1895. Declared for public benefit, c. 80, 1890.
Columbia & Kootenay Rly. & Transportation Co.	25	1883	Amended, c. 24, 1884; c. 21, 1889; c. 41, 1890. Lapsed.
Columbia & Western Rly.	8	1896	Subsidy Act. Repealed, c. 8, 1903.
„	54	1896	Incorporation. Amended, c. 12, 1898; c. 14, 1899; c. 4, 1900; c. 70, 1901; c. 9, 1903; c. 9, 1906. Declared for public benefit, c. 61, 1898.
Coast-Kootenay Rly.	69	1901	Amended c. 9, 1902. Declared for public benefit, c. 199, 1903.
Coast-Yukon Rly	58	1904	Lapsed.
Comox & Cape Scott Rly.	71	1901	„
Comox Logging & Rly Co.	63	1910	Operating.
Cowichan, Alberni, & Fort Rupert Rly	59	1904	Amended, c. 54, 1906. Lapsed.
Crawford Bay Rly.	72	1901	Lapsed.
Crow's Nest & Kootenay Lake Rly...	44	1888	Incorporation. Amended, c. 63, 1890; c. 56, 1891. Repealed, c. 53, 1894. Lapsed.
„ „ ..	72	1888	Land grant.
Crow's Nest & Northern Rly.	58	1908	Amended, c. 64, 1911. Lapsed.
Crow's Nest Southern Rly.	73	1901	Operating (G.N.R. or V.V. & E. Rly.).
Delta, New Westminster, & Eastern Rly.	57	1894	Amended, c. 54, 1897. Lapsed.
Dolly Varden Mines Rly.	....	....	Act, 1917. Time to complete, December 31st, 1918; amended, c. 22, 1919. Vested in Taylor Engineering Co., Ltd., c. 92, 1920.
Delta Rly.	34	1887	Lapsed.
Downie Creek Rly.	52	1898	„
East Kootenay Logging Rly.	52	1907	Operating.
East Kootenay Railway	61	1897	Lapsed.
East Kootenay Valley Rly.	53	1898	„
Eastern British Columbia Rly.	60	1908	Operating.
Esquimalt & Nanaimo Rly.	13	1875	Land grant. Repealed, c. 16, 1882. Amended, c. 28, 1888; c. 45, 1888.
„	26	1903	Settlers' Rights Act.
„	33	1912	Agreement. Amended, c. 60, 1913. Declared for public benefit, c. 90, 1909.
Flathead Valley Rly.	33	1903	Lapsed.
„	52	1909	„
Fording Valley Rly.	63	1905	„
Fraser River Rly.	26	1883	„

APPENDIX C—*Continued.*

RAILWAYS INCORPORATED UNDER ACTS OF THE LEGISLATURE OF BRITISH COLUMBIA—*Continued.*

Name of Railway.	Chap.	Year.	Remarks.
Graham Island Rly.	54	1909	Lapsed.
„	65	1910	Amendment. Time extended to 1918.
Grand Trunk Pacific Rly.	19	1908	Crown grant. Amended, c. 22, 1909; c. 34, 1912. Operating.
Grouse Mountain Scenic Incline Rly.	66	1911	Time extended to April 1st, 1923.
Hall, Mines, Ltd., Tramway Act	59	1894	Lapsed.
Hardy Bay & Quatsino Sound Rly.	55	1909	„
Harrison Hot Springs Tramway	68	1891	„
Howe Sound, Pemberton Valley & Northern Rly.	53	1907	$5,000 deposit with Minister of Finance.
Howe Sound & Northern Rly.	67	1910	Amendment to c. 53, 1907. Amalgamated with Pacific Great Eastern.
Hudson Bay Pacific Rly.	61	1908	Lapsed.
Imperial Pacific Rly.	77	1901	„
Island Valley Rly.	68	1910	„
Kamloops & Atlin Rly.	83	1899	„
„	48	1900	„
„	78	1901	„
Kamloops & Yellowhead Pass Rly.	58	1906	„
Kaslo & Lardo-Duncan Rly.	58	1897	„
Kaslo & Slocan Rly.	37	1892	Land grant.
„	52	1892	Incorporation. Amended, c. 41, 1894; c. 61, 1894; c. 36, 1897; C.P.R. was paid $100,000 for reconstructing Kaslo & Slocan Rly. (c. 37, 1912). Now operating.
Kaslo & Slocan Tramway Co.	52	1893	Lapsed.
Kettle River Valley Rly.	26	1910	Agreement.
„	35	1912	Ratify Agreement, Jan. 12th, 1912. } Leased to C.P.R.
„	53	1912	By-law operating.
Kitimat Rly.	54	1898	Amended, c. 84, 1899. Lapsed.
Kootenay & North-west Rly.	55	1898	Amended, c. 85, 1899. Lapsed.
Kootenay Lake Shore & Lardo Rly.	53	1893	Lapsed.
Kootenay & Athabasca Rly.	25	1887	Land grant. Lapsed.
„	35	1887	Incorporation. Lapsed.
Kootenay, Cariboo, & Pacific Rly.	34	1903	Lapsed.
Kootenay Central Rly.	79	1901	„
„	35	1903	Declared for the public benefit.
Kootenay Rly. & Navigation Co.	29	1888	Land grant. Lapsed.
„ „	46	1888	Change of title. Lapsed.
Columbia & Kootenay Rly. & Navigation Co.	35	1889	Lapsed.
Ladysmith Lumber Co. Rly.	62	1908	Operating.
Lake Bennett Rly.	80	1901	Lapsed.
Lardeau & Kootenay Rly.	54	1893	„
Lardeau Rly.	64	1897	„
Liverpool & Canoe Pass Rly.	57	1891	„
Meadow Creek Rly.	56	1909	Lapsed, $5,000 deposited with Minister of Finance.
Menzies Bay Rly.	69	1910	Time extended to March 28th, 1919.
Mid-Provincial & Nechako Rly.	81	1901	Amended, c. 45, 1902. Repealed, c. 45, 1902. Amended, c. 36, 1904; c. 60, 1906. Lapsed.
Midway-Penticton Rly.	44	1899	
Morrissey, Fernie, & Michel Rly.	37	1903	
Mountain Tramway & Electric Rly.	56	1898	Lapsed.
Mount Tolmie Park & Cordova Bay Rly.	55	1893	„
Naas & Skeena Rivers Rly.	69	1911	Amended, c. 79, 1916. Extension of time to May 31st, 1920.
Nakusp & Slocan Rly.	56	1893	Amended, c. 43, 1894. Taken over by C.P.R. under c. 64, 1919.
Nanaimo-Alberni Rly.	66	1897	Lapsed.
Nanaimo Electric Tramway Co.	69	1891	„
Nanaimo Railway Act	25	1881	„
Nelson & Fort Sheppard Rly.	58	1891	Amended, c. 42, 1894; c. 37, 1897.

APPENDIX C—*Continued.*

RAILWAYS INCORPORATED UNDER ACTS OF THE LEGISLATURE OF BRITISH COLUMBIA—*Continued.*

Name of Railway.	Chap.	Year.	Remarks.
Nelson & Fort Sheppard Rly.	38	1892	Land grant. Declared for the public benefit, c. 57, 1893.
,,	42	1894	Amended, c. 42, 1894; c. 37, 1897.
New Westminster-Port Moody Rly.	14	1882	Amended, c. 25, 1884. Lapsed.
Nelson & Arrow Lake	57	1893	Lapsed.
New Westminster & Vancouver Short Line Rly.	37	1889	Amended, c. 67, 1892; c. 60, 1896. Lapsed.
New Westminster Southern Rly.	27	1883	Lapsed.
,, ,,	36	1887	Amended, c. 36, 1889. Operating. G.N.P. purchased from Port Kells to Bridge, New Westminster. Since sold to Canadian Northern.
Nicola, Kamloops, & Similkameen Coal & Rly. Co.	47	1891	Amended, c. 38, 1903. Declared for public benefit, c. 164, 1903.
Nicola Valley Rly.	59	1891	Declared for the public benefit.
,,	37	1893	Chap. 50, 1892.
North Star & Arrow Lake Rly.	58	1898	Amended, c. 86, 1899. Lapsed.
Northern Vancouver Island Rly.	71	1910	
,, ,,	70	1911	Time extended to March 28th, 1919. $5,000 deposited with Minister of Finance.
Okanagan & Kootenay Rly.	40	1890	Lapsed.
,,	64	1890	,,
Osoyoos & Okanagan Rly.	59	1893	,,
Pacific Great Eastern Rly.	34	1913	Amended, c. 61, 1913; c. 62, 1913; c. 65, 1914.
,,	36	1912	Under construction.
Pacific Northern & Eastern Rly.	39	1903	Lapsed.
Pacific Northern & Omineca Rly.	50	1900	Amended, c. 55, 1902; c. 77, 1902; c. 40, 1903; c. 67, 1905; c. 58, 1909. Lapsed. Security deposited with Minister of Finance.
Pacific Rly.	73	1910	Lapsed.
Peace & Nass River Rly.	73	1911	,,
Penticton Rly.	74	1910	,,
Portland & Stikine Rly.	59	1898	,,
Portland Canal Short Line	59	1909	Amended, c. 74, 1911. Now called Canadian North-eastern Rly. Abandoned.
Portland Canal Rly.	56	1907	Lapsed.
Port Moody, Indian River, & Northern Rly.	75	1910	,,
Prince Rupert & Port Simpson Rly.	60	1909	,,
Quatsino Rly.	42	1903	,,
Queen Charlotte Island Rly.	83	1901	Amended, c. 57, 1907.
,,	63	1905	Lapsed.
Queen Charlotte Rly.	76	1910	,,
Rainy Hollow Rly.	58	1907	,,
Red Mountain Rly.	61	1893	Declared for public benefit, c. 60, 1895.
Revelstoke & Cassiar Rly.	61	1898	Lapsed.
Rock Bay & Salmon River Rly.	51	1900	,,
St. Mary's & Cherry Creek Rly.	64	1906	
St. Mary's Valley Rly.	65	1906	
Shuswap & Okanagan Rly.	26	1887	Amended, c. 30, 1888; c. 42, 1890; c. 37, 1891.
Skeena River & Eastern Rly.	62	1898	Lapsed.
Skeena River Rly. Colonization & Exploration Co.	63	1898	,,
South-east Kootenay Rly.	64	1898	,,
,,	63	1906	Amended, c. 61, 1909. Time extended to May 27th, 1919.
South Kootenay Rly.	88	1898	Lapsed.
South Okanagan Rly.	66	1906	,,
Stave Valley Rly.	70	1905	,,
Stickeen & Teslin Rly. Navigation & Colonization Co.	71	1897	,,
Toad Mountain & Nelson Tramway Incorporation	70	1891	Amended, c. 44, 1898; c. 40, 1900.
Ditto.	185	1897	Chap. 58, 1901, an Act respecting the Incorporation of Tramway, Telephone, and Telegraph Companies.

APPENDIX C—*Continued.*

RAILWAYS INCORPORATED UNDER ACTS OF THE LEGISLATURE OF BRITISH COLUMBIA—*Continued.*

Name of Railway.	Chap.	Year.	Remarks.
Tramway Inspection	50	1910	Amended, c. 51, 1911.
Upper Columbia Navigation & Tramway Co.	50	1891	
Vancouver & Grand Forks Rly.	84	1901	Lapsed.
Vancouver & Lulu Island Electric Rly. & Improvement Co.	61	1891	,,
Vancouver & Lulu Island Rly.	60	1891	Amended, c. 73, 1897; c. 52, 1900. Declared for public benefit, c. 86, 1901.
Vancouver & Nicola Valley Rly.	63	1908	Amended, c. 80, 1910. Lapsed.
Vancouver & Northern Rly.	64	1909	Lapsed.
Vancouver & Westminster Rly.	53	1900	Amended, c. 78, 1902.
Vancouver Island Hydro-electric & Tramway Co., Ltd.	....	....	Incoporated, joint-stock company, November 12th, 1912. Lapsed.
Vancouver Land & Rly. Co.	15	1882	Lapsed.
Vancouver-Nanaimo Rly. Transfer Co.	74	1897	,,
Vancouver, Northern, & Yukon Rly.	89	1899	Amended, c. 55, 1900. Lapsed.
Vancouver, Northern, Peace River, & Alaska Rly. & Navigation Co.	62	1891	Lapsed.
Vancouver, Victoria & Eastern Rly. & Navigation Co.	75	1897	Declared for public benefit, c. 172, 1905. G.N.R.
Vernon and Okanagan Rly.	63	1891	Lapsed.
Victoria & Barkley Sound Rly.	65	1909	,,
Victoria & Northern America Rly.	64	1891	,,
Victoria & Saanich Rly.	16	1886	,,
,,	29	1886	,,
Victoria & Seymour Narrows Rly.	79	1902	,,
Victoria & Sidney Rly.	39	1892	Subsidy. } Operated by G.N.R. Train service discontinued April 30th, 1919. This railway now out of business.
,,	66	1892	Incorporation. }
Victoria & Yellowhead Pass Rly. Aid	70	1902	Lapsed.
Victoria Terminal Rly. & Ferry Co.	85	1901	Amended, c. 54, 1905 } Operated by G.N.R.
,, ,,	86	1901	By-law. }
Victoria, Vancouver, & Westminster	64	1894	Amended, c. 76, 1897. Lapsed.
Victoria Harbour Rly. Co.	44	1911	Lapsed.
Wellington Colliery Rly.	28	1883	,,
,,	44	1911	Operating.
Yale Northern Rly.	87	1901	Lapsed.
Yukon Mining & Trading & Transportation Co.	38	1897	
Ditto.	77	1897	Lapsed.

APPENDIX D.

List of Railways—Industrial and Common Carriers.

Company.	Head Office.	Operating.	Miles Track.	Locomotives. Steam.	Elec.	Gas.	Equipment.	Total.
Abbotsford Timber & Trading Co.	Abbotsford	Abbotsford Mill	9	2	..	..	2 flat cars, 17 logging-trucks	21
Abernethy-Lougheed Timber Co.	Haney	Haney	14	2	..	..	1 passenger-car, 4 flat cars, 4 centre-dump cars, 30 connected trucks	41
Alberni Pacific Lumber Co.	Port Alberni	Alberni Mill	5	2	..	..	1 passenger-car, 20 flat cars, 16 single trucks	39
Anderson, P. B., Logging Co.	744 Hastings St. W., Vancouver	Knox Bay	6½	1	..	..	1 flat car, 8 single trucks, 15 connected trucks	25
Barr Bros. Manufacturing Co.	Mission	Mission	¼	..	..	1	1 connected truck	2
Beaver Cove Lumber & Pulp Co.	510 Hastings St. W., Vancouver	Beaver Cove	1¾	1	..	..	8 connected trucks	9
Beaver River Lumber Co.	713 Columbia St., New Westminster	Beaver River	....	1	..	..	.....	1
Beban, Frank, Lumber Co.	Extension	Extension	1¼	1	..	..	3 connected trucks	4
Bernard Timber Co.	744 Hastings St. W., Vancouver	Orford Bay	6	2	..	..	1 passenger-car, 1 single truck, 17 connected trucks	21
Bloedel, Stewart & Welch, Ltd.	510 Hastings St. W., Vancouver	Myrtle Point	18	3	..	..	2 passenger-cars, 5 flat cars, 10 single trucks, 50 connected trucks, 5 tank-cars	75
" " " "	" "	Union Bay	8	2	..	..	1 passenger-car, 1 flat car, 2 coal-cars, 22 connected trucks	28
Britannia Mining & Smelting Co.	Britannia Beach	Britannia	35	..	25	..	267 ore-cars	292
B.C. Mills Timber & Trading Co.	Ft. Dunlevy Ave., Vancouver	Rock Bay	27	5	..	..	1 box car, 2 flat cars, 108 single trucks	116
Brooks, Bidlake & Whittall	525 Seymour St., Vancouver	Lang Bay	4	1	..	..	6 flat cars, 2 connected trucks	9
Brooks, Scanlon & O'Brien Co.	510 Hastings St. W., Vancouver	Stillwater	17	3	..	..	2 passenger-cars, 1 box car, 10 flat cars, 37 connected trucks	53
Campbell River Lumber Co.	White Rock	Otter	1¾	1	..	..	Using Great Northern flat cars	1
Canadian Collieries (D.), Ltd.	Victoria	Extension	10½	4	..	..	5 passenger-cars, 18 coal-cars, 1 steam-shovel, 1 pile-driver	27
" " "	"	Union Bay	24	6	..	..	5 passenger-cars, 8 box cars, 14 flat cars, 230 coal-cars, 1 snow-plough	263
Canadian Robt. Dollar Co.	402 Pender St. W., Vancouver	Union Bay	6	2	..	..	1 flat car, 26 single trucks, 1 connected truck	30
" "	" "	Port Moody	11	2	..	..	1 passenger-car, 4 flat cars, 30 connected trucks	37
Canadian Western Fuel Co.	Nanaimo	Nanaimo	20	6	..	..	2 passenger-cars, 42 flat cars, 21 work-cars, 564 coal-cars, 1 steam-crane	636

APPENDIX D—*Continued.*

List of Railways—Industrial and Common Carriers—*Continued.*

Company.	Head Office.	Operating.	Miles Track.	Locomotives.			Equipment.	Total.
				Steam.	Elec.	Gas.		
Capilano Timber Co.	Pemberton Ave., N. Vancouver	Capilano	12¼	2	..	..	1 passenger-car, 3 flat cars, 11 single trucks, 33 connected trucks	50
Cheakamus Timber Co.	207 Hastings St. W., Vancouver	Cheakamus	1⅕	1	..	..		1
Clayburn Brick & Tile Co.	Clayburn	Clayburn	4	1	2	..	4 trucks	7
Columbia River Lumber Co.	736 Granville St., Vancouver	Golden	25	4	..	..	2 box cars, 2 flat cars, 56 single trucks, 3 log-loaders	97
Comox Logging & Rly Co.	736 Granville St., Vancouver	Headquarters	37	7	..	..	3 passenger-cars, 6 box cars, 211 flat cars, 12 gondolas, 30 single trucks	269
Corbin Coal & Coke Co.	Spokane, Wash.	Corbin	12	2	..	..	96 coal-cars, 2 passenger-cars, 8 work-cars, 2 steam-shovels, 1 rotary plough	111
Craig-Taylor Lumber Co.	207 Hastings St. W., Vancouver	Otter	6	2	..	..	2 flat cars, 6 connected trucks	10
Crow's Nest Pass Coal Co.	Fernie	Fernie	8	1	..	..		1
„ „ „	„	Michel	7	2	..	..	4 air-locomotives, 110 coal-cars	116
„ „ „	„	Coal Creek	8	6	..	..	9 air-locomotives, 120 coal-cars	135
Crow's Nest Pass Lumber Co.	Wardner	Skookumchuck	12	2	..	..	3 flat cars, 7 boarding-cars, 2 unloaders	14
Dolly Varden Mines Railway	Alice Arm	Alice Arm	17½	5	..	..	1 box car, 3 flat cars, 3 coal-cars, 20 ore-cars	32
Dennison Lumber Co.	Sullivan	Sullivan	....	..	..	1		1
Eastern B.C. Rly.	Spokane, Wash.	Corbin	16	2	..	..	1 passenger-car, 1 baggage-car, 8 box cars, 19 flat cars, 1 pile-driver, 1 snow-plough	33
Eastern Lumber Co.	Ladysmith	Ladysmith	2	1	..	..	2 flat cars	3
Ellis Lake Lumber Co.	718 Pacific Bldg., Vancouver	Redonda Island	4	1	..	..	4 trucks, 2 connected trucks	7
Elk Bay Timber Co.	North Arm, Fraser	Elk Bay	2½	1	..	..	1 passenger-car, 8 connected trucks	10
Elk Valley Lumber Co.	Fernie	Fernie	4¼	1	..	..	12 connected trucks	13
Granby Mining & Smelting Co.	718 Granville St., Vancouver	Anyox	6¼	4	..	..	1 box car, 17 flat cars, 50 coal-cars, 16 Western dump-cars, 21 steel cars, 1 steam-shovel	123
Galbraith & Sons	New Westminster	Murrayville	5	1	..	..	1 tank car, 1 flat car, 2 single trucks, 1 connected truck	6
Gwilt Lumber Co.	Courtenay	Courtenay	2½	1	..	..	2 connected trucks	3
Grassy Bay Timber Co.	744 Hastings St. W., Vancouver	Grassy Bay	3½	1	..	..	20 single trucks	21
Hillcrest Lumber Co.	Duncan	Duncan	2	1	..	..	2 connected trucks	3
Hoard & Flaherty	Bainbridge	Bainbridge	4½	1	..	..	10 single trucks	11
Hanna & Tretheway	Harrison Lake	Harrison Lake	2	..	..	1	4 logging-trucks	5

APPENDIX D—*Continued.*

List of Railways—Industrial and Common Carriers—*Continued.*

Company.	Head Office.	Operating.	Miles Track.	Locomotives.			Equipment.	Total.
				Steam.	Elec.	Gas.		
International Timber Co.	207 Hastings St. W., Vancouver	Campbell River	26	4	..	..	1 passenger-car, 1 box car, 1 flat car, 3 oil-cars, 8 single trucks, 50 connected trucks	68
Island Logging Co.	Duncan	Duncan	5	1	..	..	2 ballast-cars (use E. & N. Rly. flat cars)	3
James Logging Co.	602 Hastings St. W., Vancouver	Cowichan Lake	4	1	..	..	1 flat car, 22 single trucks, 25 connected trucks, 1 pile-driver, 1 log-loader	51
King-Farris Lumber Co.	New Westminster	Kings Spur	3	2	..	..	1 passenger-car, 10 single trucks, 1 connected truck	14
Lake Lumber Co.	Qualicum	Qualicum	2½	1	..	..	2 connected trucks	3
Lamb Lumber Co.	602 Hastings St. W., Vancouver	Menzies Bay	6	2	..	..	1 flat car, 9 connected trucks	12
Lyon Lumber Co.	505 Hastings St. W., Vancouver	McQuin Siding, P.G.E.	....	..	..	1		1
Mayo Lumber Co.	Duncan	Mayo Siding	3¼	1	..	..	3 flat cars, 1 connected truck, 1 log-loader	6
Mainland Cedar Co.	Connaught Bridge, Vancouver	Port Neville	6¼	1	..	..	1 flat car, 2 single trucks, 18 connected trucks	22
Merrill, Ring & Moore Co.	510 Hastings St. W., Vancouver	Duncan Bay	10	2	..	..	2 passenger-cars, 6 flat cars, 34 connected trucks	44
Morrissey, Fernie & Michel Rly.	Fernie	Fernie	16	5	..	..	6 passenger-cars, 4 box cars, 1 flat car, 46 coal-cars, 1 caboose, 1 snow-plough, 1 crane	65
McDonald & Murphy Logging Co.	736 Granville St., Vancouver	Campbell River	3¼	1	..	..	2 single trucks, 8 connected trucks	11
Magoffin & Co.	Prince George	G.T.P. Rly.	....	4	..	..		4
New Ladysmith Lumber Co.	Nanaimo	Nanaimo	9	2	..	..	11 logging-cars	13
Nicola Pine Mills, Ltd.	Merritt	Merritt, Kettle Valley	5½	1	..	..	34 flat cars	35
Nimpkish Timber Co.	510 Hastings St. W., Vancouver	Alert Bay	20	3	..	..	1 passenger-car, 4 coal-cars, 30 single trucks, 64 connected trucks, 1 pile-driver	103
Northern Construction Co.	736 Granville St., Vancouver	P.G.E. Rly.	....	2	..	..	20 dump-cars	22
Otis-Staples Lumber Co.	Wycliffe	Wycliffe	29	3	..	..	1 passenger-car, 75 connected trucks	79
Pacific Construction Co.	510 Hastings St. W., Vancouver	Esquimalt	1½	5	..	..	45 dump-cars, 3 steam-shovels	53
Pacific Great Eastern Rly.	736 Granville St., Vancouver	Squamish	371	11	..	..	49 box, 138 flat, 35 stock, 45 ballast, 27 outfit, 8 coaches, 10 gondolas, 10 oil-cars, 3 refrigerator, 2 mail and baggage, 1 combination passenger and baggage, 4 cabooses	353

APPENDIX D—*Continued.*

LIST OF RAILWAYS—INDUSTRIAL AND COMMON CARRIERS—*Continued.*

Company.	Head Office.	Operating.	Miles Track.	Locomotives.			Equipment.	Total.
				Steam.	Elec.	Gas.		
Pacific Great Eastern Rly.	736 Granville St., Vancouver..	North Vancouver ...	13	1	..	3	3 steam-shovels, 1 ditcher, 1 pile-driver, 1 crane	10
Pacific Coast Coal Mines	Victoria	South Wellington ...	20	3	..	..	3 flat cars, 48 coal-cars	54
Pacific Mills	510 Hastings St. W., Vancouver	Green Bay	4½	1	..	..	1 passenger-car, 2 ballast-cars, 1 single truck, 12 connected trucks	17
"	" "	Kimsquit	5½	1	..	..	1 passenger-car, 1 flat car, 17 connected trucks	20
"	" "	Kwatna	2¾	1	..	..	1 passenger-car, 1 flat car, 4 single trucks, 12 connected trucks	19
Pacific Shingle Co.	Coquitlam	Coquitlam	2	..	..	1	9 logging-cars	10
Powell River Co., Ltd.	510 Hastings St. W., Vancouver	Kingcome River	17¼	2	..	..	2 passenger-cars, 1 box car, 84 single trucks	89
Port Moody Tie & Lumber Co...	Port Moody	Strawberry Hill	....	..	..	1	.....	1
Ross Saskatoon Lumber Co. ...	Waldo	Waldo	10	2	..	..	25 connected trucks	27
Rat Portage Lumber Co.	1816 Granville St., Vancouver..	Harrison Hot Springs	2¼	1	..	..	1 passenger-car, 15 connected trucks ...	17
Rerrie Lumber Co.	837 Hastings St. W., Vancouver	Aldergrove	2	..	..	1	4 trucks	5
Shawnigan Lake Lumber Co. ..	200 Government St., Victoria ..	Shawnigan Lake ...	5	2	..	..	16 single trucks, 3 connected trucks ...	21
Smith-Hitchison Lumber Co. ..	207 Hastings St. W., Vancouver	Bradner	3	1	..	..	1 tank, 1 cook-car, 3 single trucks	6
Sperling Lumber Co.	Sperling	Sperling	2½	1	..	..	4 single trucks	5
Stave Falls Line (B.C.E.)	.....	Stave Falls	5	2	..	..	1 passenger and baggage coach, 13 logging-trucks	16
Superior Lumber Co.	Wellington, V.I.	.....	....	..	..	1	.....	1
Timberland Development Co. ..	713 Columbia Ave., New Westminster	Ladysmith	12	2	..	..	1 passenger-car, 8 single trucks, 22 connected trucks	33
Tynehead Lumber Co.	.....	.....	....	..	..	1	.....	...
United Grain Growers	Hutton Mills, G.T.P.	Hutton Mills	½	1	..	..	Grand Trunk Pacific cars used	1
Victoria Lumber Co.	Chemainus	Chemainus	6	6	..	..	1 flat car, 1 coal-car, 73 logging-trucks..	81
Wilson & Brady, Ltd.	739 Hastings St. W., Vancouver	Reid Bay	6	2	..	..	1 passenger-car, 5 flat cars, 4 single trucks, 16 connected trucks	28
J. C. Wilson Lumber Co.	Qualicum Beach	Qualicum Beach	1½	1	..	..	7 single trucks, 1 connected truck	9
Wolverine Lumber Co.	Murrayville	Murrayville	1¾	1	..	..	2 connected trucks	3
Totals	.....	.....	1,074 9/20	180	27	12	.....	4,229

B.C. Electric Railway—Mileage and Equipment.

Operating.	Miles.	Street-cars.	Coaches.	Box Cars.	Flats.	Baggage.	Elec. Loco.	Work-cars.	Gravel-cars.	Other Equipment.	Total.
Victoria City	41.030	62	...	...	1	...	2	1	3	1 street-sprinkler, 1 snow-sweeper	71
Saanich Division	24.720	...	7	4	13	1	1	1	2	1 line-car, 1 boarding-car, 1 portable sub-station	32
Vancouver City	109.501	231	...	...	1	...	2	4	..	2 street-sprinklers, 4 snow-sweepers, 1 line-car,* 1 snow-plough	246
North Vancouver	10.587	14	...	...	...	...	..	1	..	1 snow-plough	16
New Westminster	23.630	12	...	...	...	...	..	..	..	1 snow-sweeper	13
Central Park Line	22.139	...	33	...	...	...	2	..	..	2 freight-cars, 1 snow-plough	38
Lulu Island Line	45.969	...	11	...	...	2	2	..	..	2 freight-cars, 1 conductors' van	18
Fraser Valley Line	77.536	...	20	...	...	7	6	..	..	1 caboose, 4 conductors' vans	38
Burnaby Lake Line*	12.532	...	...	...	...	...	..	..	..	...	...
	367.644	319	71	4	15	10	15	7	5		
All divisions	367.644	319	71	186	179	10	17	23	43	3 street-sprinklers, 6 snow-sweepers, 3 snow-ploughs, 12 stock-cars, 3 logging-cars, 12 boarding-cars, 5 line-cars, 6 conductors' vans, 2 portable sub-stations, 3 pile-drivers, 2 hoists, 2 steam-shovels, 1 electric shovel	928

* Equipment supplied from Central Park Line.

Nelson Street Railway.

Nelson	4	2	...	...	...	...	..	..	..	1 snow-sweeper	4

Total miles of track	1,442.094
Total steam-locomotives	180
Total electric motors	59
Total gasolene-motors	12
Total miscellaneous equipment	5,146

VICTORIA, B.C.
Printed by William H. Cullin, Printer to the King's Most Excellent Majesty.
1922.

ANNUAL REPORT

OF

THE PROVINCIAL GAME WARDEN

OF THE PROVINCE OF

BRITISH COLUMBIA

1921

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1922.

To His Honour WALTER CAMERON NICHOL,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

The undersigned has the honour to present the Report of Provincial Game Warden for the year ending December 31st, 1921.

J. W. DE B. FARRIS,

Attorney-General.

Attorney-General's Department,

Victoria, B.C., January 23rd, 1922.

PROVINCIAL GAME WARDEN'S OFFICE,
VICTORIA, B.C., January 21st, 1922.

Honourable J. W. de B. Farris, K.C., M.P.P.,
Attorney-General, Victoria, B.C.

SIR,—I have the honour to submit herewith my Report for the year which ended December 31st, 1921.

I have the honour to be,
Sir,
Your obedient servant,

WM. G. McMYNN,
Provincial Game Warden.

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REPORT FOR THE YEAR 1921.

During the year 1921 the total number of informations laid for infractions of the "Game Act" was 329, there being an increase of 36 over the total number laid during the year 1920. Out of this number, 312 convictions were obtained, of which 10 were given suspended sentences, which is an increase in the number of convictions of 46 over those obtained during the year 1921. The fines imposed amounted to the sum of $6,455 and the number of firearms confiscated totalled 74.

A detailed statement in tabular form of all prosecutions under the "Game Act" during the year 1921 is shown in Appendix B, page 16 of this report, and a similar statement of firearms confiscated on page 18.

The following table, which gives a comparison of statistics for the years 1917, 1918, 1919, 1920, and 1921, shows concisely the results obtained by the Provincial Police in the administration of the "'Game Act" during the year 1921:—

Calendar Year.	Informations laid.	Convictions.	Cases withdrawn.	Cases dismissed.	Firearms confiscated.	Fines imposed.	Revenue derived from the Sale of Game Licences.
1917	111	97	4	10	..	$1,763 50	$ 65,487 50
1918	194	167	9	13	5	3,341 00	75,537 00
1919	267	242	..	25	36	6,024 50	116,135 00
1920	293	266	..	27	46	6,073 00	137,587 39*
1921	329	312	..	17	74	6,455 00	139,437 80*

* Including fur-tax.

FUR-TRADE REGULATIONS.

On the 28th day of July, 1921, an Order in Council was passed amending the Fur-trade Regulations, 1920, as approved by Order in Council No. 1050 on the 18th day of June, 1920, by striking out section 3 of the said regulations, and substituting the following in lieu thereof:—

3. The royalty or tax to be paid by fur-traders on pelts or skins of fur-bearing animals, pursuant to section 30 of the said "Game Act," shall be as follows:—

(*a.*) On each bear	$0 25	On each musk-rat	$0 05
„ beaver	1 00	„ otter	50
„ coyote	15	„ racoon	10
„ fisher	2 00	„ skunk	10
„ fox, silver	5 00	„ wild-cat	05
„ fox, cross	1 00	„ wolf	25
„ fox, red	50	„ wolverine	25
„ lynx	75	„ weasel, in lots of six or more, at the rate of 25 cents per dozen, or in lots under six, 5 cents each.	
„ marten	50		
„ mink	25		

(*b.*) On each pelt or skin not specifically mentioned in these regulations, a royalty or tax equal in amount to 5 per centum of the commercial value of the pelt or skin.

Every effort has been made during the year to collect all available revenue under the above regulations, and on March 2nd, 1921, I wrote to all inspectors and Chief Constables of Provincial Police as follows:—

RE "GAME ACT."

Please to render every assistance you can to the Government Agent or Agents of your police district in making thorough collection of royalty or tax as imposed by the above Act on pelts or skins of fur-bearing animals in their respective Government Agency districts. Ask every such Government Agent now to furnish you with the necessary fur-tax receipt books, as well as official fur-markers, and if they do so please to receive payments of such royalty or tax on their behalf, yourself personally or through any of your Provincial Police officers, and account therefor immediately it is received by you to the Government Agent from whom you receive such fur-tax receipt books and fur-markers, or while you continue to hold such fur-tax receipt books and fur-markers, at least in full at the end of each and every month. In the event of no payments being received by you or by any of your officers during such month, then at the end of every such month advise such Government Agent of the fact, stating shortly the reasons therefor, and at the same time send to me a copy of such letter for my information.

And on the same day I also wrote to all Government Agents throughout the Province as follows:—

RE "GAME ACT."

In reference to the collection of royalty or tax on pelts or skins of fur-bearing animals as imposed by the above Act, referred to in my letter to you of May 15th last, I regret to say that so far the total collections of such royalty or tax has been much smaller than expected, and I again appeal to you to see that all available revenue from this source is thoroughly collected in your Agency district.

To assist you in this matter I am again writing to the Provincial Police generally, and particularly to those specially employed in game-protection work within your Agency district, to receive such royalty or tax on your behalf if you will furnish them with the necessary official tax-books, as well as official fur-markers, and see that they account to you promptly for all such payments as they receive them, or at least in full at the end of each and every month, while they continue to hold such fur-tax receipt books and markers.

Whenever you need an additional number of fur-tax receipt books, please to send in requisition therefor to the Deputy Minister of Finance, and he will see that the number you ask for is duly forwarded to you. If you require any additional number of official markers with which to mark the pelts or skins of fur-bearing animals when the royalty or tax is paid thereon, please to write to me for them and I shall see that they are forwarded to you as soon as possible.

On account of various complaints received from trappers who were in isolated places as to to the difficulty experienced by them in obtaining permits to export their fur and the payment of fur-tax thereon, I wrote to all Government Agents on March 4th, 1921, as follows:—

RE "GAME ACT."

I am in receipt of a letter from the Secretary of the Game Conservation Board, in which he states that the Board has received numerous complaints from trappers who wish to obtain permits to export their fur upon payment of royalty thereon, and quotes as an example the following letter from Mr. A. Derman, of Banfield, B.C., dated the 19th ulto., viz.:—

"*The Game Conservation Board.*

"DEAR SIRS,—Some twenty-one days ago I sent you a letter for export licence for trappers. No answer yet. I sent some mink here in Canada and got for it from 25 cents to $1.40.

"I have a bunch of children; they demand food, and only way I make money for bread it is few mink I get. My licence No. 4373.

"If I have to pay taxes on fur I can do it to *Postmaster or Custom Inspector here.* Possibly with licence at $10 and taxes to add and postage there will be few cents left for kids. Send export licence to the end of March."

As the expense of sending an officer to Banfield to mark the fur referred to and receive the royalty thereon would evidently be much greater than the amount of royalty such officer would likely receive, and as the royalty imposed under the Act should be paid to the local Government Agent of the district where the trapper is operating, in every such case of this kind within your district which comes to your knowledge please to send the trapper the following information as to the royalty or tax to be paid on the pelts or skins of fur-bearing animals pursuant to section 30 of the "Game Act," viz.:—

(*a.*) On each bear	$0 50	On each beaver	$1 00
,, coyote	25	,, fisher	2 00
,, fox, silver	10 00	,, fox, cross	2 00
,, fox, red	1 00	,, lynx	1 00
,, marten	1 00	,, mink	25
,, musk-rat	05	,, otter	1 00
,, racoon	15	,, skunk	15
,, weasel	05	,, wild-cat	05
,, wolf	25	,, wolverine	50

(*b.*) On each pelt or skin not specifically mentioned in these regulations, a royalty or tax equal in amount to 5 per centum of the commercial value of the pelt or skin.

And instruct the trapper to send such fur to you, together with the name and address of the party to whom he wishes it to be exported, and the amount of royalty payable thereon. Upon receipt thereof be good enough to issue an official receipt for the amount of such royalty; have such fur officially marked and forward it to the address as requested by the trapper. Then advise the trapper that this has been done, free of charge, and at the same time send to him the receipt which you issued for the amount of the royalty paid by him.

REVENUE.

During the year 1921 the revenue collections derived from the sale of licences under the "Game Act" and from royalty or tax on fur amounted to the sum of $139,437.80, which is an increase of $1,850.41 over the amount collected during the year 1920, but of this amount $24,595.80 is fur-tax collections in 1921, while the fur-tax collections in 1920 only amounted to the sum of $5,291.39. This source of revenue in the year 1922 should also show a further increase.

In Appendix A of this report is given an analysis of the sources of revenue derived during the year 1921, as follows:—

(*a.*) From the sale of resident firearms licences from January 1st to May 31st, 1921 (page 10):

(*b.*) From the sale of resident firearms licences from June 1st to December 31st, 1921 (page 11):

(*c.*) From the sale of non-resident firearms licences from January 1st to May 31st, 1921 (page 12):

(*d.*) From the sale of non-resident firearms licences from June 1st to December 31st, 1921 (page 13):

(*e.*) From the sale of fur-traders' licences and from royalty or tax on fur from January 1st to May 31st, 1921 (page 14):

(*f.*) From the sale of fur-traders' licences and from royalty or tax on fur from June 1st to December 31st, 1921 (page 15):

(*g.*) From the sale of guides' licences from January 1st to May 31st, 1921 (page 10):

(*h.*) From the sale of guides' licences from June 1st to December 31st, 1921 (page 11):

(*i.*) From the sale of taxidermists' licences from January 1st to May 31st, 1921 (page 14):

(*j.*) From the sale of taxidermists' licences from June 1st to December 31st, 1921 (page 15):

APPENDIX A.—FINANCIAL.

REVENUE DERIVED FROM SALE OF RESIDENT FIREARMS LICENCES, JANUARY 1ST, 1921, TO MAY 31ST, 1921.

Government Agents.	O.F.L.		G.F.L.		S.F.L.		GUIDES.		F.F.L.	P.F.L.	Totals.
	No.	Amount.	No.	Amount.	No.	Amount.	No.	Amount.	No.	No.	
Alberni	15	$ 37 50	6	$ 30 00	8	$ 80 00	..	.....	...	1	$ 147 50
Anyox	1	2 50	1	5 00	1	10 00	..	.....	...	11	17 50
Ashcroft	...	.....	...	.....	2	20 00	..	.....	...	1	20 00
Atlin	...	.....	...	.....	1	10 00	..	.....	...	...	10 00
Clinton	15	37 50	3	15 00	3	30 00	..	.....	3	3	82 50
Cranbrook	3	7 50	4	20 00	...	.....	1	$ 5 00	1	...	32 50
Cumberland	6	15 00	...	.....	...	.....	..	.....	...	...	15 00
Duncan	1	2 50	1	5 00	...	.....	..	.....	1	...	7 50
Fairview	132	330 00	6	30 00	6	60 00	..	.....	7	...	420 00
Fernie	...	.....	4	20 00	2	20 00	..	.....	5	...	40 00
Fort Fraser	2	5 00	2	10 00	2	20 00	..	.....	...	...	35 00
Fort St. John	...	.....	...	.....	5	50 00	..	.....	...	...	50 00
Golden	...	.....	4	20 00	6	60 00	..	.....	...	...	80 00
Grand Forks	...	.....	1	5 00	...	.....	..	.....	...	...	5 00
Greenwood	41	110 00	3	15 00	5	50 00	..	.....	1	5	175 00
House, 150-Mile	6	15 00	2	10 00	5	50 00	..	.....	2	...	75 00
Kamloops	12	30 00	7	35 00	1	10 00	..	.....	19	6	75 00
Kaslo	1	2 50	8	40 00	7	70 00	1	5 00	5	48	117 50
Lillooet	...	.....	...	.....	1	10 00	2	10 00	...	...	20 00
Merritt	8	20 00	...	.....	4	40 00	..	.....	2	3	60 00
Nanaimo	219	547 50	31	155 00	4	40 00	..	.....	141	11	742 50
Nelson	2	5 00	4	20 00	2	20 00	..	.....	6	11	45 00
New Westminster	134	335 00	4	20 00	23	230 00	..	.....	95	1	585 00
Pouce Coupe	...	.....	...	.....	5	50 00	..	.....	...	...	50 00
Prince Rupert	24	60 00	3	15 00	21	210 00	..	.....	3	7	285 00
Princeton	...	.....	...	.....	1	10 00	..	.....	2	44	10 00
Quesnel	1	2 50	...	.....	2	20 00	..	.....	2	14	22 50
Revelstoke	3	7 50	...	.....	4	40 00	..	.....	7	54	47 50
Rossland	...	.....	...	.....	...	.....	..	.....	1	14	.....
Smithers	2	5 00	1	5 00	8	80 00	..	.....	22	1	90 00
South Fort George	3	7 50	10	50 00	22	220 00	..	.....	7	50	277 50
Telegraph Creek	...	.....	...	.....	3	30 00	2	10 00	...	...	40 00
Vancouver	327	817 50	59	295 00	58	580 00	5	25 00	17	47	1,717 50
Vernon	41	102 50	4	20 00	13	130 00	1	5 00	17	...	257 50
Victoria	11	27 50	4	20 00	5	50 00	2	10 00	29	49	107 50
Wilmer	...	.....	...	.....	...	.....	..	.....	...	...	.....
Yale	1	2 50	1	5 00	...	.....	..	.....	...	...	7 50
Totals	1,014	$2,535 00	173	$865 00	230	$2,300 00	14	$70 00	395	381	$5,770 00

Revenue derived from Sale of Resident Firearms Licences, June 1st, 1921, to December 31st, 1921.

Government Agents.	O.F.L.		G.F.L.		S.F.L.		Guides.		F.F.L.	P.F.L.	Totals.
	No.	Amount.	No.	Amount.	No.	Amount.	No.	Amount.	No.	No.	
Alberni	410	$ 1,025 00	21	$ 105 00	41	$ 410 00	..	.....	46	3	$ 1,540 00
Anyox	83	207 50	10	50 00	4	40 00	..	.....	...	13	297 50
Ashcroft	151	377 50	25	125 00	11	110 00	..	.....	7	5	612 50
Atlin	1	2 50	...	.....	23	230 00	2	$ 10 00	...	15	242 50
Clinton	107	267 50	6	30 00	61	610 00	..	.....	37	4	907 50
Cranbrook	503	1,257 50	122	610 00	58	580 00	2	10 00	29	38	2,457 50
Cumberland	978	2,445 00	95	475 00	40	400 00	..	.....	214	...	3,320 00
Duncan	736	1,840 00	35	175 00	12	120 00	..	.....	229	...	2,135 00
Fairview	555	1,387 50	35	175 00	16	160 00	..	.....	7	1	1,722 50
Fernie	435	1,087 50	236	1,180 00	49	490 00	1	5 00	8	2	2,762 50
Fort Fraser	20	50 00	16	80 00	22	220 00	..	.....	35	3	350 00
Fort St. John	5	12 50	6	30 00	14	140 00	..	.....	3	....	182 50
Golden	136	340 00	70	350 00	56	560 00	3	15 00	42	23	1,265 00
Grand Forks	232	580 00	29	145 00	19	190 00	..	.....	23	23	915 00
Greenwood	196	490 00	13	65 00	22	220 00	..	.....	68	27	775 00
House, 150-Mile	143	357 50	19	95 00	65	650 00	5	25 00	53	6	1,127 50
Kamloops	1,016	2,540 00	85	425 00	138	1,380 00	..	.....	438	78	4,345 00
Kaslo	110	275 00	74	370 00	41	410 00	..	.....	29	49	1,055 00
Lillooet	56	140 00	29	145 00	13	130 00	1	5 00	11	8	420 00
Merritt	265	662 50	15	75 00	28	280 00	..	.....	29	27	1,017 50
Nanaimo	1,532	3,830 00	52	260 00	18	180 00	..	.....	123	13	4,270 00
Nelson	675	1,687 50	116	580 00	58	580 00	2	10 00	126	112	2,857 50
New Westminster	3,671	9,177 50	110	550 00	97	970 00	..	.....	541	34	10,697 50
Pouce Coupe	28	70 00	9	45 00	109	1,090 00	..	.....	26	1	1,205 00
Prince Rupert	856	2,140 00	194	970 00	216	2,160 00	1	5 00	39	114	5,275 00
Princeton	248	620 00	17	85 00	20	200 00	..	.....	25	33	905 00
Quesnel	53	132 50	51	255 00	97	970 00	7	35 00	29	52	1,392 50
Revelstoke	225	562 50	81	405 00	92	920 00	1	5 00	17	28	1,892 50
Rossland	303	757 50	74	370 00	5	50 00	..	.....	14	6	1,177 50
Smithers	197	492 50	52	260 00	106	1,060 00	2	10 00	200	49	1,822 50
South Fort George	165	412 50	396	1,980 00	313	3,130 00	..	.....	91	53	5,522 50
Telegraph Creek	...	.....	...	.....	29	290 00	12	60 00	...	...	350 00
Vancouver	5,088	12,720 00	506	2,530 00	223	2,230 00	21	105 00	200	239	17,585 00
Vernon	1,667	4,167 50	174	870 00	71	710 00	..	.....	192	38	5,747 50
Victoria	2,871	7,177 50	59	295 00	36	360 00	8	40 00	346	30	7,872 50
Wilmer	85	212 50	28	140 00	27	270 00	2	10 00	16	4	632 50
Yale	46	115 00	3	15 00	11	110 00	..	.....	4	27	240 00
Totals	23,848	$59,620 00	2,863	$14,315 00	2,261	$22,610 00	70	$350 00	3,297	1,158	$96,895 00

Revenue derived from Sale of Non-resident Licences, January 1st, 1921, to May 31st, 1921.

Government Agents.	Big Game.		Spring Bear.		Season Bird.		Weekly Bird.		Season Anglers.		Daily Anglers.		Totals.
	No.	Amount.	No.	Amount.	No.	Amount.	No.	Amount.	No.	Amount.	No.	Amount.	
Cranbrook	..	.....	..	.....	..	.....	..	.....	6	$ 30 00	6	$ 6 00	36 00
Cumberland	..	.....	..	.....	..	.....	..	.....	2	10 00	..	.....	10 00
Fairview	..	.....	..	.....	..	.....	..	.....	2	10 00	..	.....	10 00
Fernie	..	.....	2	$ 50 00	..	.....	..	.....	7	35 00	..	.....	85 00
Golden	..	.....	1	25 00	..	.....	..	.....	..	.....	..	.....	25 00
House, 150-Mile	..	.....	..	.....	..	.....	..	.....	2	10 00	..	.....	10 00
Kamloops	..	.....	..	.....	..	.....	..	.....	..	.....	5	5 00	5 00
Kaslo	2	$50 00	...	.....	..	.....	...	.....	..	.....	..	.....	50 00
Lillooet	..	.....	2	50 00	...	.....	...	.....	..	.....	..	.....	50 00
New Westminster	..	.....	..	.....	..	.....	..	.....	27	135 00	2	2 00	137 00
Revelstoke	1	25 00	...	.....	..	.....	...	.....	..	.....	..	.....	25 00
South Fort George	..	.....	2	50 00	..	.....	...	.....	..	.....	..	.....	50 00
Vancouver	..	.....	5	125 00	..	.....	..	.....	5	25 00	..	.....	150 00
Victoria	..	.....	..	.....	..	.....	..	.....	3	15 00	...	.....	15 00
Totals	3	$75 00	12	$300 00	..	.....	..	.....	54	$270 00	13	$13 00	$658 00

Revenue derived from Sale of Non-resident Licences, June 1st, 1921, to December 31st, 1921.

Government Agents.	Big Game.		Spring Bear.		Season Bird.		Weekly Bird.		Season Anglers.		Daily Anglers.		Totals.
	No.	Amount.	No.	Amount.	No.	Amount.	No.	Amount.	No.	Amount.	No.	Amount.	
Alberni	..	.....	..	.....	..	.....	..	.....	1	$ 5 00	1	$ 1 00	$ 6 00
Ashcroft	4	$ 100 00	..	.....	..	.....	..	.....	1	5 00	..	.....	105 00
Atlin	..	.....	..	.....	..	.....	..	.....	1	5 00	48	48 00	53 00
Clinton	2	50 00	..	.....	..	.....	..	.....	..	.....	..	.....	50 00
Cranbrook	4	100 00	..	.....	..	.....	..	.....	15	75 00	16	16 00	191 00
Cumberland	..	.....	..	.....	..	.....	..	.....	5	25 00	1	1 00	26 00
Duncan	..	.....	..	.....	..	.....	..	.....	3	15 00	..	.....	15 00
Fairview	..	.....	..	.....	..	.....	..	.....	2	10 00	4	4 00	14 00
Fernie	15	375 00	..	.....	..	.....	..	.....	34	170 00	10	10 00	555 00
Golden	12	300 00	..	.....	..	.....	..	.....	..	.....	..	.....	300 00
Grand Forks	..	.....	..	.....	..	.....	..	.....	2	10 00	..	.....	10 00
Greenwood	..	.....	..	.....	..	.....	..	.....	15	75 00	2	2 00	77 00
Kamloops	5	125 00	..	.....	..	.....	1	$ 5 00	16	80 00	44	44 00	254 00
Kaslo	..	.....	..	.....	..	.....	..	.....	2	10 00	..	.....	10 00
Lillooet	..	.....	1	$25 00	..	.....	..	.....	1	5 00	..	.....	30 00
Nanaimo	2	50 00	..	.....	..	.....	..	.....	10	50 00	19	19 00	119 00
Nelson	4	100 00	..	.....	..	.....	1	5 00	10	50 00	1	1 00	156 00
New Westminster	37	925 00	..	.....	..	.....	..	.....	39	195 00	33	33 00	1,153 00
Prince Rupert	1	25 00	..	.....	..	.....	..	.....	..	.....	4	4 00	29 00
Princeton	..	.....	..	.....	..	.....	..	.....	..	.....	3	3 00	3 00
Quesnel	4	100 00	..	.....	..	.....	..	.....	..	.....	..	.....	100 00
Rossland	..	.....	..	.....	..	.....	..	.....	2	10 00	6	6 00	16 00
Smithers	2	50 00	..	.....	..	.....	..	.....	..	.....	..	.....	50 00
South Fort George	20	500 00	1	25 00	..	.....	..	.....	2	10 00	..	.....	535 00
Telegraph Creek	13	325 00	..	.....	..	.....	..	.....	..	.....	..	.....	325 00
Vancouver	17	425 00	..	.....	..	.....	..	.....	46	230 00	17	17 00	672 00
Vernon	..	.....	..	.....	..	.....	..	.....	1	5 00	..	.....	5 00
Victoria	7	175 00	..	.....	..	.....	1	5 00	47	235 00	..	.....	415 00
Wilmer	2	50 00	..	.....	..	.....	..	.....	..	.....	..	.....	50 00
Totals	151	$3,775 00	2	$50 00	..	.....	3	$15 00	255	$1,275 00	209	$209 00	$5,324 00

REVENUE DERIVED FROM SALE OF FUR-TRADERS' AND TAXIDERMISTS' LICENCES AND FROM ROYALTY OR TAX ON FUR, JANUARY 1ST, 1921, TO MAY 31ST, 1921.

Government Agents.	Resident Fur-traders.		Non-resident Fur-traders.		Fur-tax.		Taxidermists.		Totals.
	No.	Amount.	No.	Amount.	No.	Amount.	No.	Amount.	
Alberni	1	$ 25 00	..	.....	33	$ 184 40	..	.....	$ 209 40
Anyox	..	.....	..	.....	2	2 25	..	.....	2 25
Ashcroft	..	.....	..	.....	12	118 70	..	.....	118 70
Atlin	1	25 00	...	.....	9	53 65	..	.....	78 65
Clinton	1	25 00	..	.....	29	314 65	..	.....	339 65
Cranbrook	..	.....	..	.....	7	33 65	..	.....	33 65
Cumberland	..	.....	..	.....	....	.....	1	$ 5 00	5 00
Duncan	..	.....	..	.....	6	25 25	...	.....	25 25
Fernie	..	.....	..	.....	10	86 50	..	.....	86 50
Fort Fraser	..	.....	..	.....	11	425 35	..	.....	425 35
Fort St. John	1	25 00	..	.....	21	806 35	..	.....	831 35
Golden	..	.....	..	.....	10	30 05	...	.....	30 05
Greenwood	..	.....	..	.....	5	24 30	..	.....	24 30
House, 150-Mile	5	125 00	..	.....	54	483 45	..	.....	608 45
Kamloops	2	50 00	..	.....	22	483 12	..	.....	533 12
Kaslo	..	.....	..	.....	8	32 00	..	.....	32 00
Lillooet	..	.....	...	.....	7	126 75	..	.....	126 75
Merritt	2	50 00	..	.....	8	81 60	..	.....	131 60
Nanaimo	..	.....	..	.....	1	5 80	..	.....	5 80
Nelson	2	50 00	..	.....	26	183 50	..	.....	233 50
New Westminster	..	.....	..	.....	7	33 35	..	.....	33 35
Pouce Coupe	..	.....	..	.....	44	766 65	..	.....	766 65
Prince Rupert	2	50 00	..	.....	105	1,238 20	..	.....	1,288 20
Princeton	..	.....	..	.....	1	70	..	.....	70
Quesnel	2	50 00	..	.....	30	480 65	1	5 00	535 65
Revelstoke	1	25 00	..	.....	25	622 90	..	.....	647 90
Rossland	..	.....	..	.....	4	4 70	...	.....	4 70
Smithers	5	125 00	..	.....	74	1,163 00	..	.....	1,288 00
South Fort George	4	100 00	..	.....	137	2,269 25	..	.....	2,369 25
Telegraph Creek	..	.....	..	.....	11	106 00	..	.....	106 00
Vancouver	14	350 00	..	.....	323	4,367 15	1	5 00	4,722 15
Vernon	..	.....	..	.....	13	13 80	..	.....	13 80
Victoria	2	50 00	...	.....	9	639 55	1	5 00	694 55
Wilmer	..	.....	..	.....	6	112 40	..	.....	112 40
Totals	45	$1,125 00	..	.....	1,070	$15,319 62	4	$20 00	$16,464 62

Revenue derived from Sale of Fur-traders' and Taxidermists' Licences and from Royalty or Tax on Fur, June 1st, 1921, to December 31st, 1921

Government Agents.	Resident Fur-traders.		Non-resident Fur-traders.		Fur-tax.		Taxidermists.		Totals.
	No.	Amount.	No.	Amount.	No.	Amount.	No.	Amount.	
Alberni	4	$ 100 00	..	.....	45	$ 94 35	..	.....	$ 194 35
Anyox	1	25 00	..	.....	3	2 05	..	.....	27 05
Ashcroft	1	25 00	..	.....	3	6 75	..	.....	31 75
Atlin	5	125 00	..	.....	69	359 85	..	.....	484 85
Clinton	5	125 00	..	.....	2	50	..	.....	125 50
Cranbrook	2	50 00	..	.....	1	1 00	1	$ 5 00	56 00
Cumberland	..	.....	..	.....	4	13 85	1	5 00	18 85
Duncan	..	.....	..	.....	5	12 05	..	.....	12 05
Fernie	..	.....	..	.....	2	4 00	1	5 00	9 00
Fort Fraser	10	250 00	..	.....	...	.....	..	.....	250 00
Fort St. John	1	25 00	..	.....	6	380 80	..	.....	405 80
Golden	..	.....	..	.....	8	17 55	..	.....	17 55
House, 150-Mile	12	300 00	..	.....	20	151 15	..	.....	451 15
Kamloops	3	75 00	..	.....	18	63 80	..	.....	138 80
Kaslo	1	25 00	..	.....	2	1 75	..	.....	26 75
Lillooet	1	25 00	..	.....	...	.....	..	.....	25 00
Merritt	2	50 00	..	.....	4	20 90	..	.....	70 90
Nelson	4	100 00	1	$ 200 00	23	66 95	..	.....	366 95
New Westminster	..	.....	..	.....	1	1 70	..	.....	1 70
Pouce Coupe	6	150 00	1	200 00	38	709 10	..	.....	1,059 10
Prince Rupert	6	150 00	..	.....	86	811 60	..	.....	961 60
Quesnel	8	200 00	..	.....	19	28 07	1	5 00	233 07
Revelstoke	1	25 00	..	.....	14	144 25	1	5 00	174 25
Rossland	1	25 00	..	.....	2	75	..	.....	25 75
Smithers	18	450 00	..	.....	78	675 60	..	.....	1,125 60
South Fort George	18	450 00	..	.....	94	805 65	..	.....	1,255 65
Telegraph Creek	7	175 00	..	.....	12	373 90	..	.....	548 90
Vancouver	32	800 00	2	400 00	441	4,431 71	9	45 00	5,676 71
Vernon	2	50 00	..	.....	9	50 90	1	5 00	105 90
Victoria	7	175 00	1	200 00	4	27 10	..	.....	402 10
Wilmer	1	25 00	..	.....	6	18 55	..	.....	43 55
Totals	159	$3,975 00	5	$1,000 00	1,019	$9,276 18	15	$75 00	$14,326 18

APPENDIX B.

ENFORCEMENT OF THE "GAME ACT."

Prosecutions (Provincial Police Districts).

Description of Offence.	Northern.				Central.					Kootenay.			Vancouver.	Vanc. Island.		Dismissals.	Suspended Sentence.	Convictions.	Total No. of Cases.	Fines and Penalties imposed.
	Prince Rupert.	Fort St. John.	Hazelton.	Fort George.	Lillooet.	Yale.	Kamloops.	Vernon.	Boundary.	N.E. Kootenay.	S.E. Kootenay.	W. Kootenay.		Victoria.	Nanaimo.					
Game Animals.																				
Possession of deer-meat during closed season	....	....	....	....	1	....	4	....	....	1	3	1	8	....	3	1	....	21	22	$ 480 00
Killing deer during closed season	1	....	....	....	....	1	....	4	....	....	....	....	2	....	1	....	2	11	11	300 00
Possession of game during closed season	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	2	30 00
Hunting deer during closed season	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	1	1	25 00
Killing deer (fawns)	....	....	....	....	....	....	....	....	....	....	....	....	2	....	....	....	....	2	2	75 00
Possession of deer (fawn)	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	1	1	40 00
Killing bear without a licence	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	1	1	25 00
Game Birds.																				
Setting traps for game birds	....	....	....	....	....	....	....	....	....	....	....	....	....	2	....	1	....	2	3	100 00
Game and game birds on premises of logging camp	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	1	1	25 00
Possession of hen pheasant	....	....	....	....	....	....	....	....	2	....	....	....	2	2	2	1	....	8	9	190 00
Shooting game birds without a licence	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	1	1	25 00
Possession of grouse during closed season	....	....	....	....	....	....	1	....	....	....	....	....	2	....	2	1	....	5	6	175 00
Killing grouse during closed season	....	....	....	....	....	....	1	....	....	....	....	1	2	1	3	....	....	8	8	375 00
Possession of wild geese	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	1	1	25 00
Shooting a sea-gull	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	1	1	10 00
Hunting ducks during closed season	....	....	....	....	....	....	....	....	....	....	....	....	1	....	1	....	....	2	2	20 00
Allowing dog to hunt game birds	....	....	....	....	....	....	....	....	....	....	....	....	....	1	2	....	....	3	3	30 00
Shooting game birds during closed season	....	....	....	....	....	....	....	1	....	....	....	....	1	4	2	....	....	8	8	155 00
Possession of grouse over the bag limit	....	....	....	....	....	....	....	....	....	....	....	....	....	1	1	1	....	2	3	10 00
Possession of wild duck during closed season	....	....	....	....	....	....	....	....	....	....	....	....	7	....	1	....	....	8	8	235 00
Possession of game birds during closed season	....	....	....	....	....	....	....	....	....	....	....	....	3	2	1	....	....	6	6	85 00
Game birds on premises of shop or restaurant	....	....	....	....	....	....	....	....	....	....	....	....	1	2	....	1	....	3	4	40 00
Killing a hen pheasant	....	....	....	....	....	....	....	....	....	....	....	....	1	3	....	....	....	4	4	125 00
Selling game birds	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	1	1	50 00
Licences.																				
Non-resident hunting game without a licence	....	....	....	....	....	....	2	....	....	....	....	....	....	....	....	....	....	2	2	100 00
Carrying firearms without a licence	....	....	....	1	4	1	10	1	4	1	....	3	34	8	23	2	5	95	97	965 00
Obtaining resident fur-trader's licence by furnishing false information	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	1	1	100 00
Trading in furs without a licence	....	....	....	2	....	....	....	....	....	....	....	....	1	....	....	1	....	3	4	100 00
Carrying firearms without a licence, under age	....	....	....	....	....	....	1	....	....	....	....	2	1	....	....	3	....	4	7	10 00
Non-resident carrying firearms without a licence	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	1	1	50 00
Failing to produce licence at request of constable	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	1	1	10 00

Hunting game birds with prospector's licence	....	....	....	....	....	..	....	....	....	....	....	....	1	....	.	....	....	1	1	$ 10 00
Using another person's licence	....	....	....	....	....	..	...	....	....	....	....	....	2	....	....	....	....	2	2	100 00
Non-resident using resident's licence	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	1	1	10 00
Failing to have taxidermist's licence	....	....	....	...	...	...	....	....	....	....	....	....	1	....	....	....	....	1	1	50 00
Firearms.																				
Carrying pump-gun not properly plugged	....	....	....	....	....	....	3	....	1	....	....	....	11	1	1	...	....	17	17	225 00
Carrying firearms in auto	....	....	....	....	....	....	1	....	....	....	....	....	13	3	8	1	....	25	26	305 00
Discharging firearms in a restricted area	...	....	....	....	....	....	....	....	....	....	....	....	6	....	...	....	....	6	6	60 00
Carrying firearms in a restricted area	....	....	....	....	....	....	...	....	....	....	....	....	....	2	....	....	....	2	2	30 00
Trapping.																				
Possession of pelts of fur-bearing animals illegally	....	....	2	8	4	....	....	1	....	1	....	....	1	.. .	...	....	3	20	20	1,220 00
Trapping without a licence	....	....	....	1	...	...	....	....	....	....	....	....	1	....	....	....	....	2	2	35 00
Possession of traps without a licence	....	....	....	1	....	....	....	....	....	....	....	....	1	....	....	1	....	2	3	10 00
Trapping during closed season	....	....	....	....	....	....	....	3	....	....	...	....	...	....	..	...	....	3	3	75 00
Miscellaneous.																				
Buying furs caught out of season	....	....	....	1	....	....	1	...	....	...	....	....	....	....	....	....	...	2	2	60 00
Exporting furs without a permit	....	....	....	2	....	....	....	...	....	....	....	....	....	....	...	1	....	2	3	.....
Giving false information to officer	....	1	....	....	....	....	...	....	....	....	....	....	2	....	....	....	....	3	3	35 00
Trading in beaver during closed season	....	....	....	....	....	....	1	....	....	....	....	....	....	...	....	....	....	1	1	50 00
Using poison bait for fur-bearing animals	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	1	1	20 00
Killing beaver during closed season	....	....	....	....	2	....	....	....	....	....	....	....	....	....	....	2	....	2	4	.....
Failing to keep proper record of all skins purchased or acquired	....	....	....	....	....	....	....	...	....	....	....	....	2	...	....	....	....	2	2	150 00
Trespassing on a game reserve	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	1	1	10 00
Hunting on a pheasant-farm	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	1	1	15 00
Gaol Sentences.																				
Pit-lamping	...	....	....	....	....	....	....	....	....	....	....	....	...	....	1	....	....	1	1	(1 month.)
Possession of willow-grouse during closed season	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	.	....	1	1	(2 weeks.)
Possession of deer-meat during closed season	....	....	....	....	....	....	....	2	....	....	...	....	....	....	....	...	....	2	2	(4 months.)
Defendant not found.																				
Carrying firearms without a licence	..	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	1	1	.....
Totals	3	1	2	17	12	2	25	13	8	3	4	7	115	35	55	17	10	312	329	$6,455 00

LIST OF FIREARMS CONFISCATED FOR INFRACTIONS OF THE "GAME ACT," JANUARY 1ST, 1921, TO DECEMBER 31ST, 1921.

Confiscated from.	Magistrate.	Date of Confiscation.	Place of Confiscation.	Kind confiscated.
		1921.		
Sprintall, Wm.	N. McCallum	Aug. 25	Grand Forks	1 revolver.
Smith, Vernon	"	" 25	"	1 rifle.
Emberry, J. J.	E. E. Hutton	Nov. 1	Summerland	1 pump-gun.
Smith, James	H. Bowden	Jan. 10	Tappen	1 shotgun.
Hill, Matt	R. W. Bruhn	Nov. 4	Solsqua	1 shotgun.
Barton, S.	A. Fehr	Oct. 13	Walhachin	1 shotgun.
Hemming, S. C.	"	" 13	Lower Nicola	1 pump-gun.
Abbott, F.	J. B. Leighton	Sept. 27	Quesnel	2 rifles, 1 pump-gun.
Vickers, H.	J. Brown	July 23	Anglemont	1 rifle.
Bloom, H. A.	"	" 23	"	1 rifle.
Gresham, E. F.	"	" 23	"	1 rifle.
Perkins, P.	R. P. Bradley	June 22	Sorrento	1 rifle.
Thomas, I. (Indian)	"	" 22	Squilax	1 rifle.
Baptiste, Paul (Indian)	"	" 22	"	1 rifle.
McGimskey, T.	A. Carruthers	Jan. 24	Campbell River	1 shotgun.
Harmiston, O.	W. A. W. Hames	" 26	Oyster River	1 shotgun.
Playfair, W.	A. G. Freeze	Aug. 3	Alberni	1 rifle.
Martin, A.	C. H. Beevor-Potts	July 22	Nanaimo	1 rifle.
Brechin, H. S.	"	" 12	"	1 rifle.
Marino, C.	A. G. Freeze	Aug. 23	Bainbridge	1 shotgun.
Gilmour, J.	C. H. Beevor-Potts	Sept. 1	Nanaimo	1 shotgun.
Nelson, D. H.	"	" 2	Coombs	1 shotgun.
Jagger, T. H.	"	" 9	Nanaimo	1 rifle.
Nietrich, J. C.	"	" 15	"	1 shotgun.
Farrar, J.	"	" 29	"	1 pump-gun.
Illstad, T.	G. Nordstrom	Oct. 3	Quatsino	1 pump-gun.
Gardner, W. H.	C. H. Beevor-Potts	" 20	Nanaimo	1 pump-gun.
Bon Quon	"	" 24	Nanoose	1 rifle.
Russell, W.	J. Stewart	" 26	Ladysmith	1 rifle.
Baker, A.	G. Nordstrom	Dec. 12	Quatsino	1 pump-gun.
George, W.	J. Stillwell-Clute	Jan. 5	Crescent Beach	1 pump-gun.
Christiansen, M.	H. O. Alexander	Feb. 17	Pender Harbour	1 rifle.
Germyn, O.	A. Phillips	April 22	Lynn Valley	1 rifle.
Butler, S. J.	Judge Howie	" 5	Powell River	1 pump-gun.
Minnichello, J.	J. Banham	Jan. 24	"	1 pump-gun.
Winram, T. J.	J. Watts-Downey	July 29	Vancouver	1 rifle.
Lamount, M.	J. Laity	" 20	South Vancouver	1 shotgun.
Duncan, A.	C. Christensen	" 22	Rand	1 shotgun.
Oldershaw, J.	J. Stillwell-Clute	Aug. 30	Vancouver	1 rifle.
Muras, J.	J. McKee	" 13	Westham Island	1 rifle.
Sturgess, C.	P. H. Wilson	" 25	Chilliwack	1 auto. shotgun.
Tisdale, G. P.	A. Deans	Oct. 19	Jardine	1 shotgun.
Towle, A.	"	" 19	"	1 shotgun.
McLean, W.	J. Stillwell-Clute	" 21	Serpentine Flats	1 shotgun.
Ullsperman, G. A.	"	" 31	Blaine	1 pump-gun.
Gowans, R.	"	" 31	Hall's Prairie	1 shotgun.
Paris, R.	"	" 31	Serpentine Flats	1 shotgun.
Smart, J. T.	"	" 31	Highway, Surrey	1 shotgun.
Kato, K.	J. McKee	" 8	Steveston	1 shotgun.
Morrow, G. H.	J. Stillwell-Clute	" 14	White Rock	1 shotgun.
Makatsaka, S.	J. McKee	" 20	Steveston	1 shotgun.
Rundgren, C.	J. Stillwell-Clute	Nov. 18	Colebrook	1 shotgun.
Coehenor, E. E.	A. Deans	" 11	Vancouver	1 pump-gun.
Fukahashi, S.	J. Stillwell-Clute	" 18	Cloverdale	1 shotgun.
Stanvich, A. C.	Magistrate Shaw	" 12	Coal Harbour	1 shotgun.
Irvine, D.	O. E. Darline	" 25	Vancouver	1 auto. shotgun.
Dicker, F.	J. Stillwell-Clute	Dec. 5	"	1 shotgun.
Dicker, C.	"	" 5	"	1 shotgun.
Sargent, J. C.	H. O. Alexander	" 23	"	2 rifles and 1 revolver.
Long, H.	"	" 15	"	1 shotgun.

List of Firearms confiscated for Infractions of the "Game Act," January 1st, 1921, to December 31st, 1921—*Continued.*

Confiscated from.	Magistrate.	Date of Confiscation.	Place of Confiscation.	Kind confiscated.
		1921.		
Pollock, K.	H. O. Alexander	Dec. 31	Vancouver	1 shotgun and 1 rifle.
Miller, F. J.	„	„ 31	„	1 pump-gun.
Overton, C. O.	P. H. Wilson	„ 21	Chilliwack	1 pump-gun.
Jung Quong	J. Maitland-Dougall	April 27	Cobble Hill	1 shotgun.
Ioyota, I.	„	Oct. 4	Duncan	1 rifle.
Bowerman, W.	R. W. Corbett	„ 18	Pender Island	1 pump-gun.
Layritz, R.	Geo. Jay	„ 12	Colquitz	1 shotgun.
Legge, A.	L. Norris	„ 20	Vernon	1 rifle.
Larsch, V.	T. Wilson	Sept. 24	Stave Falls	1 rifle.

APPENDIX C.

OFFICERS AND GUIDES.

List of Provincial Police Officers.

Headquarters, Victoria.

Superintendent's Office—

Superintendent	Wm. G. McMynn	Victoria.
Chief Clerk and Cashier	Geo. A. Hood	„
Clerk	C. Clark	„
„	H. H. Clarke	„
„	R. Peachey	„
„	T. Conly	„

Provincial Motor Licence Office—

Clerk	C. A. Booth	Victoria.
„	G. H. Jennings	„
„	C. E. L. Agassiz	„

Victoria District—

Senior Constable	Otway Wilkie	Victoria.
Constable	Robert Owens	„
„	M. C. McPhail	„
„	W. Kier	Duncan.
„	J. N. Rogers	Ganges.
„	E. B. Irving	Luxton.
„	F. E. L. Philp	Sidney.

Boundary District.

Chief Constable	J. A. Fraser	Greenwood.
Constable	G. F. Killam	Grand Forks.
„	A. E. Spall	Keremeos.
„	W. B. Stewart	Midway.
Senior Constable	F. Fryer	Princeton.
Constable	W. Lakeland	Fairview.

Fort George District.

Deputy Inspector	Thos. W. S. Parsons	South Fort George.
Chief Constable	A. McNeill	„ „
Constable	H. H. Mansell	„ „
„	H. Avison	„ „
„	M. J. Condon	„ „

Fort George District—Continued.

Constable	S. Service	South Fort George.
„	G. F. Smith	„ „
„	M. Gorman	McBride.
„	R. J. Breckon	Hutton.
„	J. A. Williams	Vanderhoof.
„	T. van Dyk	South Fort George
„	W. B. Jones	Lucerne.

Hazelton District.

Chief Constable	J. Kelly	Smithers.
Constable	W. J. Service	„
„	P. Carr	Burns Lake.
„	S. Cline	Hazelton.
„	A. Fairbairn	Telkwa.
„	R. W. Franklin	Hazelton.

Kamloops District.

Deputy Inspector	W. L. Fernie	Kamloops.
Chief Constable	Geo. H. Adam	„
Constable and Gaoler	A. Noble	„
Constable	H. P. Hughes	„
„	F. C. Clark	„
„	F. N. Emmott	Ducks.
„	J. Urquhart	Mount Olie.
„	J. Eggleshaw	Savona.
„	R. Pritchard	Sicamous.
„	J. W. Chadwick	Chase.

North-east Kootenay District.

Chief Constable	R. J. Sutherland	Golden.
Constable	J. M. Bella	„
„	D. A. McDonald	Arrowhead.
„	F. D. Markland	Revelstoke.
„	W. R. Henley	Athalmer.
„	F. H. Butwell	Golden.

South-east Kootenay District.

Deputy Inspector	W. R. Dunwoody	Fernie.
Chief Constable	W. V. Spiller	„
Constable	S. J. McNally	„
„	A. W. Collins	Coal Creek.
„	G. J. Duncan	Elko.
„	W. Hilton	Natal.
„	F. G. Brown	Waldo.
„	C. H. Martin	Wardner.
„	W. H. Laird	Yahk.
„	G. C. Mortimer	Cranbrook.
„	H. Grainger	Canal Flats.
„	G. W. Donahoe	Cranbrook.
„	Arthur Arden	Kimberley.
Clerk and Constable	T. F. C. Salt	Fernie.
Constable	R. F. Mills	Michel.
„	A. J. Smith	Corbin.
„	R. E. Norris	Kettle Valley.
„	G. Whiting	Elk Prairie.
„	O. Ekstrum	Canal Flats.

West Kootenay District.

Chief Constable	E. Gammon	Nelson.
Constable	H. W. King	„
„	E. A. Vachon	Creston.
„	Geo. M. Gunn	New Denver.
„	H. McLaren	Salmo.
„	J. F. Johnston	Trail.
„	P. Jupp	Nakusp.
„	C. F. Oland	Kaslo.

Lillooet District.

Chief Constable	Geo. H. Greenwood	Quesnel.
Constable	G. E. Ashton	Clinton.
„	T. Higginbottom	Lillooet.
„	W. Riley	Soda Creek.
„	F. W. Gallagher	150-Mile House.
„	H. C. Clarke	Alexis Creek.
„	H. Bishop	Williams Lake.
„	H. E. Harrison	Lillooet.
„	G. F. Turner	„

Nanaimo District.

Chief Constable	A. T. Stephenson	Nanaimo.
Constable	A. D. I. Mustart	„
Clerk and Constable	F. E. Bradner	„
Constable	W. V. Shepherd	„
„	H. N. Wood	Alberni.
„	J. A. Anderson	Clayoquot.
„	J. Russell	Ladysmith.
„	F. Varney	Quatsino.
„	Alex. Dunbar	Cumberland.
„	R. M. Stewart	Comox.
„	R. Marshall	Nanaimo.
„	R. W. Sheffield	Alberni.

Prince Rupert District.

Chief Constable	A. C. Minty	Prince Rupert.
Constable	A. Saint	„
„	J. P. Scarlett	Stewart.
„	A. Dryden	Anyox.
„	F. Broughton	Bella Coola.
„	R. P. Ponder	Masset.
„	D. S. Cameron	Alice Arm.
„	R. Beavan	Ocean Falls.
„	R. Gibson	Port Essington.
„	A. W. Stone	Rivers Inlet.
„	R. Webster	Atlin.
„	C. A. Mancor	Terrace.
„	T. F. Harper-Reed	Boundary.
„	H. Martin	Prince Rupert.

Peace River District.

Chief Constable	Harry Taylor	Fort St. John.
Constable	Isaac Gunnell	„ „
„	W. A. S. Duncan	Pouce Coupe.
„	E. Forfar	Hudson Hope.
Senior Constable	C. G. Barber	Pouce Coupe.

Vancouver District.

Deputy Inspector	W. Owen	Vancouver.
Chief Constable	F. Cruickshank	„
Senior Constable	Samuel North	„
Clerk and Constable	P. M. Morrey	„
Cashier	W. H. Handley	„
Clerk and Constable	A. Grundy	„
„ „	E. McArthur	„
„ „	W. J. Wismer	„
Constable	H. J. McDougall	„
„	J. Renner	Abbotsford.
„	R. L. Matthews	Alert Bay.
„	S. S. Saunders	Britannia Beach.
Senior Constable	J. MacDonald	New Westminster.
Constable	W. J. Voisey	„
„	W. H. Hadley	Powell River.
„	S. Marshall	Quathiaski Cove.
„	W. F. Islip	Squamish.
„	J. G. Cunningham	Vancouver.
„	T. R. Baker	„
„	G. Williams	North Vancouver.
„	R. D. Young	Powell River.
„	H. C. Pyke	New Westminster.
„	W. H. Cameron	Sardis.
„	W. V. Fenton	Ladner.
„	J. Murray	Port Moody.
„	J. W. McIntosh	Vancouver.
„	G. C. Sharpe	„
„	J. Mead	„
„	C. F. Kearns	Pender Harbour.
„	Murdo Ross	Vancouver.

Vernon District.

Chief Constable	Geo. A. Carter	Vernon.
Constable	P. Pentecost	„
„	J. Rankin	„
„	R. M. Robertson	Penticton.
„	Evan Patterson	Vernon.
„	J. M. Smith	Enderby.
„	E. C. Graham	Kelowna.
„	J. J. McConnell	Penticton.

Yale District.

Chief Constable	R. W. Bowen	Ashcroft.
Constable	W. Greenwood	Hope.
„	D. A. Hazelton	Lytton.
„	P. Badman	Merritt.
„	A. Strang	North Bend.

LIST OF GUIDES, SEASON 1921.

Atlin District.

Williams, T.	Atlin.

Cassiar District.

Fann, B.	Telegraph Creek.
Dick, L.	„
Decker, L.	„
Henyer, P.	„

Cassiar District—Continued.

Brooks, N.	Telegraph Creek.
Abesta, B.	„
Colbert, J.	„
McClusky, M.	„
Quash, C.	„
Williams, G.	„
McClusky, P.	„
Ball, G.	„
Conover, A. B.	Clearwater.
Shangle, E.	Iskoot.

Hazelton District.

Enoch, P.	Hazelton.
Burnes, G. M.	„

Fort George District.

Bowan, F.	Lucerne.
Denison, G. N.	„
Brittian, H.	„
Johnston, W.	„
Abrahams, E.	„
Johnson, O.	McBride.
Sweeney, W.	„
Cochrane, W.	Croydon.
Goodell, W. R.	„
Doucette, F. G.	Dunster.
Bergstrom, J.	Aleza Lake.
Hansen, A.	„
Hargreaves, J. A.	Tete Juane Cache.
Fournier, B.	„
Hargreaves, F. M.	„
Hargreaves, G.	„
Hawkins, J.	Canoe River.
Van-Shaik, J.	Rooney P.O.
Sykes, B. S.	Penny.
Hartman, M. G.	„
Goodell, L. E.	Shere.

Barkerville District.

Cochran, J. D.	Barkerville.
Gilchrist, G.	„
Kilbee, F. D.	„
Reed, F. de W.	„
Thompson, N. W.	„
Thompson, R.	„
Turner, G. F.	„

Lillooet District.

Marson, W. M.	Lillooet.
Manson, W. G. C.	„
Rebasker, S.	„
Gaspard, E.	Horsefly.
Hutch, J. T.	Keithley Creek.
Brogan, M.	Quesnel Forks.
Marquardt, W. J.	„
Sheridan, M.	„
Moore, K. B.	Tatlayoko Lake.

Kootenay District.

Stevens, E. ..... Howser.
Miller, J. B. ..... Wardner.
McCorkell, B. ..... Field.
Sheek, W. P. ..... „
Thomas, G. ..... „
Nixon, W. ..... Invermere.
Hislop, G. F. ..... Glacier.
Harrison, G. H. ..... „
Whyte, J. ..... Fort Steele.
Nicol, A. H. ..... „
Cameron, C. ..... Canal Flats.
McQuarrie, N. ..... Elk Valley.
Legace, R. ..... Golden.
Lawrence, C. ..... „
Thor, H. ..... Nelson.
Woodrow, C. O. ..... „

Nanaimo District.

Smith, J. C. ..... Oyster River.

Prince Rupert District.

Solasse, W. ..... Prince Rupert.

Vernon District.

Finlaison, F. D. ..... Mabel Lake.

Vancouver District.

Boyce, J. ..... Vancouver.
Haswell, E. A. ..... „
Douglas, R. D. ..... „
Mansell, F. ..... „
Williams, A. B. ..... „

Victoria District.

Janes, G. A. ..... Cowichan Lake.

APPENDIX D.

GAME REGULATIONS, 1921.

Pursuant to the provisions of the "Game Act," the Lieutenant-Governor in Council has been pleased to make regulations as follows:—

GAME REGULATIONS, 1921.

1. The prohibition declared by section 9 of the "Game Act," being chapter 33 of the Statutes of 1914, as to the hunting, trapping, taking, wounding, and killing of game, are, subject to the provisions of section 2 of these regulations, hereby removed to the extent and within the periods and limits and subject to the provisions hereinafter set out respectively, as follows:—

BIG GAME.

(*a.*) *Moose*, of the male sex, in the Electoral Districts of Atlin, Fort George, Omineca, and Cariboo, open seasons from September 1st, 1921, to December 15th, 1921, both dates inclusive, in the years 1921 and 1922.

In the Electoral District of Columbia, open season from October 1st, 1921, to November 15th, 1921, both dates inclusive.

(*b.*) *Caribou*, of the male sex, throughout the Province, except Queen Charlotte Islands, and except all that portion of the Province lying to the south and to the east of the main line of the Canadian Northern Railway, open season from September 1st, 1921, to December 15th, 1921, both dates inclusive, in the years 1921 and 1922.

(*c.*) *Mountain-sheep*, of the male sex, in that portion of the Province north of the main line of the Grand Trunk Pacific Railway, open season from September 1st, 1921, to November 15th, 1921, both dates inclusive.

In the Electoral Districts of Columbia, Cranbrook, and Fernie, open season from October 1st, 1921, to November 15th, 1921, both dates inclusive.

In that portion of the Electoral District of Lillooet situate and lying to the west of the Fraser River and to the south of the Hanceville and Clinton Wagon-road, from the Fraser River Bridge at Churn Creek to the northern boundary of the Lillooet Electoral District, open season from September 1st, 1921, to November 15th, 1921, both dates inclusive.

(*d.*) *Mountain-goat*, throughout the Province, open season from September 1st, 1921, to December 15th, 1921, both dates inclusive, in the years 1921 and 1922.

(*e.*) *Bear*, on Vancouver Island, open season from November 1st, 1921, to June 30th, 1922, both dates inclusive; throughout the remainder of the Province, open season from September 1st, 1921, to June 30th, 1922, both dates inclusive:

Provided that no bear shall be trapped in any part of the Province.

(*f.*) *Deer (Mule, White-tail, and Coast)*, bucks only, throughout the Province, except Queen Charlotte Islands and those portions of Vancouver Island known and defined as North and South Saanich and Highland Districts, and except *White-tail Deer* in North and South Okanagan, Similkameen, and Greenwood Electoral Districts, open season from September 17th, 1921, to December 15th, 1921, both dates inclusive.

FUR-BEARING ANIMALS.

(*g.*) All fur-bearing animals, except *Beaver*, throughout the Western District, open season from November 1st, 1921, to March 31st, 1922, both dates inclusive.

In that portion of the Eastern District south of the main line of the Canadian Pacific Railway, for the trapping of *Otter*, *Mink*, and *Musk-rats*, open season from January 1st, 1922, to March 31st, 1922, both dates inclusive.

In that further portion of the Eastern District and in the Northern District, north of the main line of the Canadian Pacific Railway, for the trapping of *Otter*, *Mink*, and *Musk-rats*, open season from January 1st, 1922, to May 31st, 1922, both dates inclusive.

All other fur-bearing animals, except *Beaver*, in the Northern and Eastern Districts, open season from November 1st, 1921, to March 31st, 1922, both dates inclusive.

GAME BIRDS.

For the purpose of defining the open season for game birds and trapping of fur-bearing animals, the Province shall be divided into three districts, to be known as the Northern, Eastern, and Western Districts:—

Northern District shall mean and include the Electoral District of Atlin and all that portion of the Province situate and lying to the north of the main line of the Grand Trunk Pacific Railway and to the east of the summit of the Cascade Range.

Eastern District shall mean and include all that portion of the Province situate and lying to the east of the summit of the Cascade Range and south of the main line of the Grand Trunk Pacific Railway.

Western District shall mean and include all that portion of the Province situate and lying to the west of the summit of the Cascade Range and south of the Electoral District of Atlin.

(*h.*) *Ducks* (except *Wood* and *Eider Ducks*), *Wilson* or *Jack Snipe*, *Black-breasted* and *Golden Plover*, and the *Greater* and *Lesser Yellowlegs*, in the Northern District, open season from the first Saturday next following August 31st in any year to a date three months and fifteen days later, both dates inclusive—viz., September 3rd, 1921, to December 18th, 1921.

In the Eastern District, open season from the first Saturday next following August 31st in any year to a date three months and fifteen days later, both dates inclusive—viz., September 3rd, 1921, to December 18th, 1921.

In the Western District (in that portion of the Western District to the north of the 53rd parallel of latitude), open season from the first Saturday next following September 7th in any year to a date three months and fifteen days later, both dates inclusive—viz., September 10th, 1921, to December 25th, 1921.

In the Western District (in that portion of the Western District to the south of the 53rd parallel of latitude), open season from the first Saturday next following October 14th in any year to a date three months and fifteen days later, both dates inclusive—viz., October 15th, 1921, to January 30th, 1922.

(*i.*) *Geese* and *Brant*, in the Northern District, open season from the first Saturday next following August 31st in any year to a date three months and fifteen days later, both dates inclusive—viz., September 3rd, 1921, to December 18th, 1921.

In the Eastern District, open season from the first Saturday next following August 31st in any year to a date three months and fifteen days later, both dates inclusive—viz., September 3rd, 1921, to December 18th, 1921.

In the Western District (in that portion of the Western District to the north of the 53rd parallel of latitude), open season from the first Saturday next following September 7th in any year to a date three months and fifteen days later, both dates inclusive—viz., September 10th, 1921, to December 25th, 1921.

In the Western District (in that portion of the Western District to the south of the 53rd parallel of latitude), open season from the first Saturday next following November 7th in any year to a date three months and fifteen days later, both dates inclusive—viz., November 12th, 1921, to February 27th, 1922.

(*j.*) *Grouse* and *Ptarmigan* (except *Prairie-chicken*), in the Northern District and in those portions of the Omineca, Fort George, and Cariboo Electoral Districts situate and lying in the Eastern District, open season from September 3rd, 1921, to November 15th, 1921, both dates inclusive. In the remainder of the Eastern District, open season from September 17th, 1921, to October 1st, 1921, both dates inclusive.

In the Western District, in the Islands Electoral District, except in North Saanich, *Blue Grouse*, open season from September 17th, 1921, to October 1st, 1921, both dates inclusive. In the remainder of the Western District, *Blue Grouse*, except in those portions of Vancouver Island known and defined as South Saanich and Highland Districts, Cowichan Municipality, and in those portions of the Islands and Comox Electoral Districts known and defined as North Saanich, Denman and Hornby Islands, open season from September 17th, 1921, to November 13th, 1921, both dates inclusive.

(*k.*) *Quail*, in the Eastern District, in the Electoral Districts of Similkameen and South Okanagan only, open season from October 22nd, 1921, to November 20th, 1921, both dates inclusive.

In the Western District, in the Electoral Districts of Cowichan, Esquimalt, Saanich (except Oak Bay Municipality), Newcastle south of the Nanaimo River and the Islands, open season from October 15th, 1921, to December 31st, 1921, both dates inclusive.

(*l.*) *Pheasants* (except *Golden* and *Silver Pheasants*), in the Eastern District, cock birds only, in the Electoral Districts of South Okanagan and Similkameen, open season from October 22nd, 1921, to October 29th, 1921, both dates inclusive.

In the Western District, in that portion thereof known and defined as Vancouver Island, except in the Electoral Districts of Alberni and Newcastle north of the Nanaimo River, and except in the Municipality of Oak Bay, cock birds only, open season from October 15th, 1921, to November 30th, 1921, both dates inclusive.

In the Western District, in those portions of the Islands Electoral District known and defined as Sidney Island, Moresby Island, Pender Island, and Mayne Island, cock birds only, open season from October 15th, 1921, to November 30th, 1921, both dates inclusive.

In the Western District, in that portion of the Islands Electoral District known and defined as Saltspring Island, and in those portions of the Comox Electoral District known and defined as Denman and Hornby Islands, cock birds only, open season from October 15th, 1921, to December 31st, 1921, both dates inclusive.

In the Western District, in that portion thereof situate and lying on the mainland, except that portion of the Municipality of Point Grey lying north of that part of Marine Drive extending along the northern bank of the Fraser River from the eastern boundary of said municipality

to the mouth of said river, and except those further portions of the mainland known as Delta Municipality, cock birds only, open season from October 15th, 1921, to November 30th, 1921, both dates inclusive.

In the Western District, in that portion thereof situate and lying on the mainland known and defined as Delta Municipality, cock birds only, open season from October 15th, 1921, to October 24th, 1921, both dates inclusive.

(*m.*) *European Partridge*, in the Western District, in the Delta Electoral District, open season from October 15th, 1921, to October 24th, 1921, both dates inclusive; in that portion of the Islands Electoral District known and defined as North Saanich District and those further portions of Vancouver Island known and defined as South Saanich and Highland Districts, open season from November 19th, 1921, to November 30th, 1921, both dates inclusive.

BAG LIMITS.

Big Game.

In respect of big game throughout the Province, as defined in the "Game Act," no person shall anywhere kill or take or have in their possession during the open season more than three *Deer*, all of which must be of the male sex, and no person shall kill or take or have in their possession during the open season more than two *Grizzly Bear* or three *Bear* of any other species.

In that portion of the Province north of the main line of the Grand Trunk Pacific Railway, no person shall at any time kill or take or have in their possession during the open season more than two *Mountain-sheep* of the male sex.

In the Electoral Districts of Columbia, Fernie, Cranbrook, Cariboo, and Lillooet, no person shall at any time kill, take, or have in their possession more than one *Mountain-sheep* of the male sex.

Game Birds.

No person shall, in any district hereinafter designated, kill, take, or have in their possession on any one day any greater number of game birds than the daily bag limits hereinafter set out respectively; nor kill, take, or have in their possession during the entire open season any greater number of game birds than the total bag limit so set out.

Western District.—Pheasants, cocks only: Daily bag limit, 6; total bag limit, 25.

Quail: Daily bag limit, 20; total bag limit, 150.

European Partridge: Daily bag limit, 6; total bag limit, 25.

Eastern District, South Okanagan and Similkameen Electoral Districts.—Pheasants, cocks only: Daily bag limit, 4; total bag limit, 12.

Quail: Daily bag limit, 10; total bag limit, 50.

Throughout the whole Province.—Ducks: Daily bag limit, 20; total bag limit, 150.

Geese: Daily bag limit, 10; total bag limit, 50.

Brant: Daily bag limit, 10; total bag limit, 50.

Grouse: Daily bag limit, 6; grouse of any one species, not more than 12 of all species; total bag limit, 50.

Every person shall, upon the request of any constable, furnish satisfactory proof to him of the dates on which any big game or game birds were killed or taken.

2. The open season declared by these regulations shall not apply to the following parts of the Province, viz.:—

(*a.*) Kaien Island, in the Prince Rupert Electoral District.

(*b.*) That portion of Dewdney Electoral District known as the Colony Farm.

(*c.*) That portion of the District Municipality of Burnaby bounded as follows: Commencing at the junction of Sperling Avenue and the right-of-way of the British Columbia Electric Railway Company, Limited; thence due north to the line of the Great Northern Railway; thence following the said railway in an easterly direction to the Cariboo Road; thence southerly along the Cariboo Road to the right-of-way of the British Columbia Electric Railway Company, Limited; thence westerly along the line of the British Columbia Electric Railway to point of commencement.

(*d.*) Those further portions of the said District Municipality of Burnaby known respectively as the Oakalla Prison Farm and Central Park.

(*e.*) That portion of Nanaimo Harbour described as follows:—Between the high-water mark on Vancouver Island and a line drawn as follows: Commencing at Brechin Point, Departure

Bay, near the City of Nanaimo; thence in an easterly direction to the most westerly point of Newcastle Island; thence south-easterly to the most easterly point on Newcastle Island; thence to the most westerly point of Protection Island; thence south-easterly to Gallows Point on Protection Island; thence to Jack's Point on Vancouver Island; including all the waters of Nanaimo Harbour, Exit Channel, and the area including the Nanaimo River tide-flats.

(*f.*) Also that portion of the West Arm of Kootenay Lake adjoining the City of Nelson, described as follows: Commencing at a point on the line of the Columbia and Kootenay Railway about one mile west of the City of Nelson on the south bank of the Kootenay River, known as the "Slaughter-house"; thence northerly to the north bank of the said Kootenay River; thence easterly following the said north bank of the said Kootenay River to the north side ferry-landing, about one mile east of the City of Nelson; thence following the south bank of the said Kootenay River in a westerly direction to the point of commencement.

3. The prohibitions declared by subsection (1) of section 34 of the "Game Act," as to the buying, selling, and having in possession of big game and game birds, so far as the same relate to game lawfully killed or taken, are hereby removed to the extent and within the periods and limits and subject to the provisions hereinafter set out, as follows:—

(*a.*) *Moose* and *Caribou*, bulls over one year of age, in the Electoral Districts of Atlin, Fort George, Omineca, and Cariboo, from October 1st, 1921, to December 15th, 1921, both dates inclusive.

(*b.*) *Bear*, on Vancouver Island, from November 1st, 1921, to June 30th, 1922, both dates inclusive; in the remainder of the Province, from September 1st, 1921, to June 30th, 1922, both dates inclusive.

J. W. DE B. FARRIS,
Attorney-General.

Department of the Attorney-General,
Victoria, B.C., July 26th, 1921.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1922.

FIFTH ANNUAL REPORT

OF

THE LAND SETTLEMENT BOARD

OF THE PROVINCE OF

BRITISH COLUMBIA

FOR THE YEAR ENDING

DECEMBER 31ST, 1921

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1922.

To His Honour WALTER CAMERON NICHOL,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

I have the honour to submit for your consideration herewith the Annual Report of the Land Settlement Board for the year 1921.

E. D. BARROW,

Minister of Agriculture.

Department of Agriculture,

Victoria, B.C., September 5th, 1922.

LAND SETTLEMENT BOARD OF BRITISH COLUMBIA,

VICTORIA, B.C., September 1st, 1922.

The Honourable E. D. Barrow,

Minister of Agriculture, Victoria, B.C.

SIR,—I have the honour to transmit herewith the Fifth Annual Report of the Land Settlement Board for the year ending December 31st, 1921.

I have the honour to be,

Sir,

Your obedient servant,

R. D. DAVIES,

Director.

LAND SETTLEMENT BOARD OF BRITISH COLUMBIA.

Agricultural Loans.

On account of the sharp decline in prices obtainable for agricultural commodities, and owing to other temporary conditions unfavourable to the undertaking of new projects for development or production, it was decided during the early part of 1921 to restrict very materially the making of new loans, and to confine business to the inspection of existing loans and other necessary administrative work. Until July, however, a number of small progress advances were made. Practically all of these loans were to new settlers engaged in development-work.

During July loaning was entirely suspended largely for the reasons stated above, and a review of the system was commenced, looking to its better adaptation to existing conditions and to the needs of agricultural development in the Province.

From an examination of loans granted since the introduction of the agricultural-credit system into British Columbia it is apparent that a large proportion of the moneys advanced has been applied to the clearing of previous encumbrances on properties offered as security. While the "Land Settlement and Development Act" gives full sanction to such application of funds, it must be evident that in order to carry out the main intention of the Act—namely, increased production—it is desirable that as large a proportion as possible of the moneys made available shall be more directly applied to development in the shape of permanent improvements, and particularly in the bringing of increased acreage under cultivation.

Accordingly, during 1920 and the current year very decided preference was given to the making of small loans to new settlers and generally to the favouring of applications where the Land Settlement Board was in a position to secure the expenditure of moneys to specific work, such as land-clearing, erection of buildings, or purchase of stock and equipment. Many of these loans were made on the progress system and single advances were restricted to such an amount as could be properly expended during the current season by the borrower.

The significance of this change is that, while perhaps from ordinary business standpoints the making of loans to fully established farmers would be preferable on account of the greater value of the security offered, the economic value created through a system of progress loans to aid the struggling settler in developing new land is considered to be of greater moment to the Province as a whole.

It has been found, however, that certain other difficulties have arisen in connection with the change referred to.

The making of loans on the progress system and the principle of securing application of moneys strictly to development-work entails close and continued inspection. Moreover, the restriction of advances to new settlers confines work very largely to the more undeveloped districts in the Province, where cost of administration is materially increased by delays and expense incidental to the lack of transportation facilities.

After short experience with progress loans certain definite conclusions were arrived at. In stating these conclusions it is necessary to mention that in considering any changes the broad objective indications of the "Land Settlement Act" were taken as a basis. On this foundation it was clearly essential that the duty of the Department making agricultural loans was to furnish *productive credit;* i.e., credit that would tend in its application to create something of permanent material value as distinct from the course of ordinary loaning business, in which necessary requirements would be fulfilled by the mere advance and return of moneys without increasing the productive security.

The conclusions were as follows: (1.) That the system of small progress advances for development was best suited to present conditions in this Province. (2.) That in order to provide for the extension of such a system on a more adequate scale and for the highest degree of economy in administration a new plan for appraisal and inspection work was required.

Acting on these conclusions, the question of the provision for the proper extension of the system was taken up. It was decided that to obviate the difficulty in connection with the high cost of appraisal and inspection work in outlying districts the appointment of local representatives would be advisable. A ready means to this end was available through the close

co-operation existing with the other branches of the Department of Agriculture. Field representatives of that Department were available in many of the districts, whose services in the making of appraisals and inspections have been utilized as far as possible, thus providing an expert and economical means of dealing with loan applications.

At present, however, the system of field representatives does not entirely cover the agricultural districts of the Province. This is particularly the case in Central British Columbia, where the activities of the Land Settlement Board are necessarily greater than in the older-established agricultural districts. With the possible extension, however, of the field service of the Department of Agriculture in the future, a very satisfactory basis for proper co-operation in connection with agricultural loans will be afforded.

SETTLEMENT AREAS.

With the establishment of four new areas during 1921, the preparatory work of examination and selection of lands in Central British Columbia which has proceeded steadily during the past four years was brought to a conclusion. The net results are that a careful examination has been made of all lands that are at present adjacent to transportation throughout Central British Columbia, and that approximately 200,000 acres of new land suitable for agricultural production have been selected as a basis for future settlement. By the provisions of the "Land Settlement and Development Act" governing settlement areas these selected lands are also controlled in the matter of price, so that the new settler on whom the burden of development-work falls is secured against the handicap entailed by the payment of an excessive price for land suitable for cultivation.

The following table shows the position of all settlement areas at the close of the fiscal year ending March 31st, 1922:—

District.	Total Acreage in Areas.	Acreage to which Board has Title.	Acreage sold to Settlers.	No. of Settlers.	Acreage improved indirectly through Operation of Act.	Total Penalty Tax Assessed against Unimproved Lands.
Bulkley Valley, Areas 1, 6, and 11	41,756	8,305	5,515	38	6,939	$ 5,465 78
Nechako Valley, Areas 2, 4, and 12	81,182	21,703	10,079	68	11,552	17,338 17
Francois Lake, Area 10	15,621	4,999	1,873	12	2,179	1,375 00
Prince George and Cariboo District, Areas 5, 7, 8, 9, 13, and 14	54,580	21,950	8,777	52	4,272	2,303 09
Totals	193,139	56,957	27,144	170	24,942	$26,482 04

In explanation of the above table it is pointed out that the total acreage in areas refers to the total lands selected by the Board. Of these lands, 56,957 acres have been actually acquired, partly by purchase from owners at the Board's appraised price and partly by free transfer in the case of Crown lands from the Department of Lands. Of the lands so acquired, 27,144 acres have been sold to *bona-fide* settlers.

Out of the total acreage in areas a further 24,942 acres have been improved by owners to escape the penalty tax levied in cases where no improvements are made. On the remaining lands held by private owners penalty tax amounting to $26,482.04 has been levied.

In considering the total number of families placed directly by the Land Settlement Board, it is important to note that discriminatory powers are given to the District Representatives of the Board who deal with applications for land. Each representative is held responsible that no application is forwarded unless the prospective settler is possessed of some capital or its equivalent in stock and equipment, and has also sufficient experience to enable him to undertake the work of development with reasonable prospect of success. On account of this necessary safeguard a large number of applications have been refused. It should furthermore be understood that it has been necessary, particularly in the year just closed, to discourage settlement to some extent in districts where conditions were considered temporarily unfavourable for the new settler.

From the foregoing it will be seen that the work of the Land Settlement Board has not been restricted to any stereotyped plan for the general encouragement of new settlement, but that an effort has been made to regulate and direct settlement along sound and permanent lines.

In the past year, on account of the growing number of settlers in the districts covered by the settlement-area system, attention has been turned to the carrying-out of work by the local offices to promote the welfare of new settlers.

For convenience in administration, Central British Columbia, which had been previously administered as a single district, was divided into two districts. R. G. Sutton, a graduate of Guelph Agricultural College, who had already considerable experience in Central British Columbia as Field Supervisor for the Soldier Settlement Board, was appointed District Representative of the Land Settlement Board at Prince George, his district extending from Prince George to Williams Lake in the Cariboo, and from Prince George westward to Endako, comprising the settlement areas in the Nechako Valley, Prince George District, and the Northern Cariboo. D. D. Munro, District Representative at Telkwa, continued in charge of the territory between Endako and Prince Rupert, comprising settlement areas in the Bulkley Valley and Francois Lake Districts.

Cattle Clubs.

The cattle-club system was continued, large shipments of live stock being made under this plan. During the summer new clubs were formed at Mud River, Quesnel, and Telkwa, the total number of live stock supplied reaching 1,523 at the end of the year.

Development Areas.

During the year 1921 Area No. 1 at Merville has continued to make strides towards becoming an entirely self-supporting community. Advances have been made to settlers on the progress-loan system to enable them to carry on work of development on their farms, also to assist in the purchase of stock, implements, seed, etc. With this assistance rendered by the Board, settlers cleared a considerable acreage during the season and cropped over 350 acres. Twenty-five houses and forty barns, besides a number of smaller buildings, were erected, making a total of sixty permanent dwellings and fifty first-class barns erected on the area to date.

The principal crops grown were clover, oats, potatoes, and garden-truck. The clover turned out to be an exceptionally fine crop. Potatoes and all garden-truck also did very well considering the lack of fertilizer. The oat-crop, as is usual on new land, was somewhat light.

Thirty-six head of horses and 145 head of dairy stock were purchased by settlers through the Board, besides which, settlers, without Board assistance, provided themselves with some eighty head of horses and cattle, also a considerable number of chickens, pigs, etc.

All the stock purchased was good grade stock selected by the District Agricultural Representative in company with the settler concerned. Upwards of twenty settlers have by this means been enabled to commence shipping cream to the creamery at Courtenay, and a considerable amount of interest is being shown in this branch of farming, to the extent that over sixty shares in the Comox Creamery have been purchased by various settlers.

In the spring of 1921 the Board secured expert advice on the suitability of the area for small-fruit growing. As a result of the report received, 50,000 strawberry-plants and 6,500 raspberry-canes, as well as logans, currants, etc., were supplied by the Board and distributed amongst the settlers. These were planted out in small plots of ¼ to ½ acre each in various parts of the area. The strawberries particularly made splendid growth during the summer.

The Merville growers, almost without exception, joined the Comox Fruit-growers' Association last season, and had by the end of December made arrangements for marketing the next year's crop.

In April, 1921, the store operated by the Board was satisfactorily disposed of to a private party, who has continued to operate same throughout the year. A substantial two-story building was erected on corner lot in Community Centre at a cost of $2,500 and has been leased for a period of five years to the storekeeper. In this building there is ample accommodation for a good general store, as well as living apartments for storekeeper and family.

A comfortable building for the purpose of providing accommodation and refreshments to visitors and travellers has also been erected in Community Centre and leased to a private party for a term of years. A garage and blacksmith-shop have also been built and are in operation.

In Development Area No. 2, at Camp Lister, near Creston, the original plan of development—i.e., to clear 5 acres on each farm, build dwelling-house, and completely fence the farm—has been practically carried through to completion.

The first development unit, comprising ninety lots (approximately 2,000 acres), has been finished and some seventy settlers previously employed by the Board on development-work have been allotted the farms. It is the intention of these settlers to purchase same and make their homes permanently in the area. In all, 450 acres have been cleared, of which 365 are also ploughed. Forty-nine permanent houses have been built and over 50 miles of fencing completed. Fourteen miles of roads have also been cleared and graded in order to give access to all farms.

In addition to above, in the spring of 1921 the Board purchased 10,500 fruit-trees, principally apples, and twenty-eight of the 5-acre plots were planted out to trees during the season. Arrangements have been made for the further planting of at least thirty additional 5-acre plots in 1922.

The general store operated by the Board in this area has been disposed of and a similar store is now being conducted by the settlers themselves in the Community Centre under the co-operative plan.

Development Area No. 3, near Kelowna, on account of unavoidable delay in securing irrigation rights, has been advantageously leased for a term of years pending an adequate supply of water for intensive farming purposes.

Development Area No. 4, near Fernie, has been entirely disposed of to settlers, who are now making good progress in the development-work on their own farms.

SUMAS RECLAMATION PROJECT.

During the first two months of the last fiscal year very material additions were made to the dredging equipment provided for construction-work on the Sumas Project. The power-line also, to enable the two electric dredges to work, was brought to completion. The heavy delays, however, in the equipping and the building of this plant had a very serious effect on the progress of the work. As a result the high-water period of 1921 set in before the new dredges had fairly settled down to work.

In May the rapid rise of flood-water necessitated the closing-down of practically all dredges. This condition prevailed throughout the month of June owing to flood-levels which were again abnormal. During the high-water period floods reached the highest level experienced in sixteen years.

In view of the continual difficulties encountered under the system followed since the letting of this contract, advantage was taken of the cessation of work during the flood period to arrange with the contractors for certain changes in organization looking to much closer co-operation between the Land Settlement Board and the contractors, and also to a more clearly defined system for the direction of construction-work.

An agreement was reached with the contractors on all important points at issue, under which agreement direction of all construction-work was assumed by C. A. Strong, who was already associated with the contractors.

Mr. Strong has had considerable previous experience both as a civil engineer and as a dredging superintendent. His record, moreover, includes the successful carrying-out of a number of projects similar in character and difficulty to the Sumas scheme, and the building of high dykes which have successfully resisted flood conditions of a nature and severity similar to those occurring in the Sumas District.

Arrangements were also made by the contractors during the flood period to secure a large suction-dredge for the excavation of the Vedder Canal and the building of the dykes on either side.

It should be noted that the Sumas Reclamation Project, marking as it does a considerable advance in reclamation-work, involves the construction of a more elaborate system of dykes than hitherto attempted. It was therefore found necessary to secure special equipment for the work and to import certain dredges not available in Canada.

It is furthermore of importance to note that the special difficulty of the work is due to the necessity of the building of the Vedder Canal and the turning of the Vedder River during a single low-water period. The large dykes also which run parallel to the main canal require to be carried at least to average flood-level in the same period. Allowing for possible delays due to adverse weather conditions, this period could not be estimated at more than seven working

months, and the very severe conditions encountered during the past winter due to frost and flood, although unusual, have nevertheless borne out the necessity for this conservative estimate.

Early in July the abatement of flood conditions enabled work to proceed on the various units. Excepting for preparatory work on the West Vedder Dyke, the Vedder Canal unit had not been touched before the high-water period, work being confined to subsidiary units, with the single exception of the large Fraser Dyke, which had been practically completed for about 2 miles between its junction with the East Vedder Dyke and Cannor Station.

On August 23rd the suction-dredge "Tacoma" commenced to work on the Vedder Canal at the point of its junction with the Sumas River. In its first running month (September) 427,953 cubic yards of material were dredged from the canal cut by this machine. In order to hold material in place in the dyke bulk-heading was used, the dyke being carried in three lifts to elevation 95 by this means.

As work proceeded it was found that the action and settlement of material in the dykes fully bore out the expectations based on the plan adopted.

The excavation of the main canal proceeded at the same rate until the end of October, when a severe freshet in the Vedder River, followed by heavy and continued frost and accompanied by ice-storms, gave a decided check to progress.

From this time until late in February frozen ground, ice in the canal, and inclement weather hampered progress considerably. As these conditions became more severe the drag-line excavators working on dyke units were shut down, but the excavation of the canal cut and the building of the West Vedder Dyke was steadily continued. That this work was sustained during such adverse conditions, and that the completion of the canal in the period set was thus assured, reflects great credit on the contractors' organization.

On account of the difficulties stated above the yardage output on the Vedder Canal unit fell considerably below the average established in the first two months. Serious trouble also was encountered in places where old slough-bottoms intersected the canal line. During the freshets occurring in the winter heavy loss was encountered by the contractors through the washing-out of temporary work, and a large amount of material was expended in filling up low ground adjacent to the dyke.

In February, on account of heavy delays, it was found necessary to provide additional equipment for work on the Vedder Canal. Accordingly, the suction-dredge "King Edward" was secured under a rental agreement from the Dominion Government Department of Public Works and the suction-dredge "Robson" from the Pacific Dredging Company of Vancouver. These two machines commenced work on the East Vedder Dyke during March. At this time the canal cut was approaching its intersection point with the Vedder River, and for the previous two months the suction-dredge "Tacoma" had been building both East and West Vedder Dykes simultaneously. Extreme low water, following the continued cold weather, made it necessary for the suction-dredges to work below the grade set for the canal in order to secure flotation.

Towards the end of March the actual diversion of the Vedder River was carried out very successfully by cutting a small ditch to connect the new cut with the river-channel and by gradually filling in the old river-bed as the stream scoured out its new course.

In November a contract was let to the Canadian Fairbanks Company, of Vancouver, for pumping machinery in connection with the McGillivray Creek Dam, consisting of two 24-inch centrifugal pumps directly connected to 60-horse-power Westinghouse motors. In January the contract for the building of the culvert and sluice-way for this dam was let to Hodgson, King & Marble, of Vancouver. Work on this culvert was commenced in January and will be complete early in April.

At the close of the fiscal year work on all units in the Sumas Project was being maintained at a good rate, the working force employed averaging 300 men.

While, as indicated in the above report, progress has been hampered very seriously by weather conditions, it is now considered that the soundness of the scheme for the reclamation of the Sumas lands has been fully demonstrated, and that while delays and the losses incidental thereto cannot be avoided during freshet periods until the termination of the construction phase, the ultimate and satisfactory completion of the project is assured.

On account of the very low-water conditions during March it was possible to examine the lands in the lake-bed. As far as may be determined by inspection, these lands appear to be quite equal in value for agricultural purposes to any lands within the district.

In submitting the above report, I desire to call attention to the excellent service rendered by the officials in charge of special work in the field.

The successful completion of the selection and appraisal of lands during the establishment of the fourteen settlement areas in Central British Columbia reflects great credit on D. D. Munro, who has personally directed this work from its commencement.

In the Prince George District R. G. Sutton has given excellent service since his appointment as District Representative.

The development areas at Merville and Creston have been under the direction of District Representative W. S. Latta, assisted by Supervisors A. H. Rowberry and K. G. Halley. The fact that this branch of the Board's work is a new departure, for which there exists no working precedent, has entailed the creation of a system largely by the officials in immediate charge, who have also been called upon to work under most trying conditions.

LAND SETTLEMENT BOARD.

REPORT OF LOAN APPLICATIONS AS AT DECEMBER 31ST, 1921.

1 unappraised application from 1918, Peace River District, No. 1723, for $500; fee, $3.
1 unappraised application from 1919, Peace River District, No. 1956, for $600; fee, $3.
16 unappraised applications from 1920 for $30,150; fees, $104; disposed of as follows:—

3	applications granted ($5,000)	$ 5,250 00	
11	applications cancelled or withdrawn	18,900 00	
2	unappraised	6,000 00	$16 00
16		$30,150 00	

1921 Applications.

143 applications received for $180,450, disposed of as follows:—

56	applications granted (for $48,925)	$ 60,650 00
68	applications rejected or withdrawn	97,100 00
5	applications appraised; no action	5,250 00
14	applications unappraised	17,450 00
143		$180,450 00

Recapitulation of Unappraised Applications.

No.		Amount.	Fee.
1723	(1918)	$ 500 00	$ 3 00
1956	(1919)	600 00	3 00
1973	(1920)	4,000 00	9 00
1974	„	2,000 00	7 00
2125	(1921)	500 00	3 00
2148	„	1,750 00	7 00
2181	„	500 00	3 00
2210	„	1,000 00	7 00
2233	„	800 00	7 00
2236	„	2,500 00	7 00
2237	„	750 00	3 00
2239	„	750 00	3 00
2241	„	1,200 00	7 00
2244	„	1,000 00	7 00
2247	„	1,000 00	7 00
2249	„	2,500 00	7 00
2262	„	2,000 00	7 00
2263	„	1,200 00	7 00
		$24,550 00	$104 00

STATUS OF LAND SETTLEMENT BOARD LOANS AS AT DECEMBER 31ST, 1921.

284	loans in force at December 31st, 1920	$596,840 00
11	loans granted during 1921 for	13,775 00
295		$610,615 00
17	loans paid off	$32,150 00
1	loan foreclosed	750 00
18	loans disposed of for	32,900 00
277	loans in force at December 31st, 1921	$577,715 00
	Balance of loans as at December 31st, 1921—	
	Principal	$517,011 39
	Interest	19,324 67
		$536,336 06

AGRICULTURAL CREDIT COMMISSION.

REPORT OF LOAN APPLICATIONS AS AT DECEMBER 31ST, 1921.

There were at the end of 1921 three applications outstanding unappraised:—

No.		Amount.	Fee.
597,	Peace River District	$1,500 00	$ 7 50
600,	„ „	1,000 00	5 00
864,	„ „	600 00	5 00
3		$3,100 00	$17 50

STATUS OF AGRICULTURAL CREDIT COMMISSION LOANS AS AT DECEMBER 31ST, 1921.

351	loans in force at December 31st, 1920, for	$692,000 00
58	loans granted	55,950 00
409		$747,950 00
2	loans cancelled	$ 5,500 00
13	loans paid off	16,500 00
15		22,000 00
394	loans in force, December 31st, 1921	$725,950 00
4	loans granted, principal not yet paid	$ 2,400 00
	Amount still due to borrowers on same	2,057 50
	Balance of loans as at December 31st, 1921—	
	Principal	$633,645 37
	Interest	18,879 61
		$652,524 98

VICTORIA, B.C., July 28th, 1922.

I have examined the accounts of the Land Settlement Board (including the separate accounts of the Agricultural Credit Commission) for the year ended December 31st, 1921, and append hereto the following statements:—

(*a.*) Balance-sheet as at December 31st, 1921, Land Settlement Board.

(*b.*) Statement of Revenue and Expenditure, Land Settlement Board.

(*c.*) Balance-sheet as at December 31st, 1921, Sumas Dyke.
(*d.*) Balance-sheet as at December 31st, 1921, West Nicomen Dyke.
(*e.*) Statement of Revenue and Expenditure, West Nicomen Dyke.
(*f.*) Balance-sheet as at December 31st, 1921, Cameron Drainage District.
(*g.*) Statement of Revenue and Expenditure, Cameron Drainage District.
(*h.*) Balance-sheet as at December 31st, 1921, Agricultural Credit Commission.
(*i.*) Statement of Revenue and Expenditure, Agricultural Credit Commission.

I hereby certify that the appended balance-sheets and revenue and expenditure statements are in agreement with the books of the Land Settlement Board (including the separate books of the Agricultural Credit Commission), and in my opinion are properly drawn up so as to exhibit a true and fair statement of the financial position of the Board as at December 31st, 1921, and the result of the operations for the year ended that date, according to the best of my information and the explanations given to me.

A. N. MOUAT, C.A.,
Comptroller-General, Province of British Columbia.

(*a.*) BALANCE-SHEET AS AT DECEMBER 31ST, 1921, LAND SETTLEMENT BOARD.

Assets.			Liabilities.	
Cash and advances		$ 21,926 86	Provincial Treasury advances	$3,067,422 97
Loans—			Accounts payable	6,038 99
Loans granted	$ 651,040 33		Appraisal fees (unearned)	104 00
Less amounts due to borrowers	134,028 94			
		517,011 39		
Mortgages foreclosed		976 65		
Overdue interest		19,324 67		
Accrued interest		13,644 74		
Accounts receivable		111,592 85		
Land purchases and development—				
Purchase price	$ 587,633 53			
Development costs	959,538 36			
	$1,547,171 89			
Less areas under agreement of sale	360,569 51			
		1,186,602 38		
Land under agreement of sale—				
Sale price	$ 360,569 51			
Less receipts and rebates	155,042 37			
		205,527 14		
Dyking and drainage projects—				
Cameron Drainage District, Capital Acct.	$ 8,420 00			
Sumas Dyke, Capital Acct.	602,942 59			
West Nicomen Dyke, Maintenance Acct.	20,940 80			
		632,303 39		
Office supplies, furniture, and equipment (*less* depreciation)		5,158 00		
Quesnel Creamery		8,083 92		
		$2,722,151 99		
Balance—				
Deficit as at December 31st 1920	$ 165,325 04			
Deficit for year ended December 31st, 1921	186,088 93			
		351,413 97		
		$3,073,565 96		$3,073,565 96

(*b.*) STATEMENT OF REVENUE AND EXPENDITURE FOR YEAR ENDED DECEMBER 31ST, 1921, LAND SETTLEMENT BOARD.

Expenditure.		Revenue.	
Salaries	$ 33,191 19	Appraisal fees	$ 504 50
Travelling expenses	4,709 71	Exchange, discount, and commission...	21 51
Office expenses	3,692 02	Legal fees	79 55
General expenses	1,368 73	Advertising silos	93 45
Interest on Treasury advances	159,201 08	Interest	76,078 62
Rebates on Returned Soldiers' Land Purchases	60,512 64	Agricultural Credit Commission, proportion of operating expenses	5,163 80
Depreciation, furniture and equipment	443 59		
Costs of investigations written off	4,911 40		$81,941 43
		Balance, being deficit for year carried to balance-sheet	186,088 93
	$268,030 36		$268,030 36

(*c.*) BALANCE-SHEET AS AT DECEMBER 31ST, 1921, SUMAS DYKE.

Assets.		Liabilities.	
Construction	$425,769 61	Land Settlement Board advances	$602,942 59
Right-of-way	19,515 17	Accounts payable	36,542 57
Equipment	9,428 13	Holdback on construction contract	62,907 57
Engineering	69,620 07		
Interest	19,822 58		
Preliminary expenses	11,601 24		
Overhead expenses	2,015 45		
Contractors' Account	144,620 48		
	$702,392 73		$702,392 73

(*d.*) BALANCE-SHEET AS AT DECEMBER 31ST, 1921, WEST NICOMEN DYKE.

Assets.		Liabilities.		
Dyke-construction	$ 94,867 96	Debentures, due May 1st, 1953—		
Pumps	682 01	Authorized	$90,000 00	
Sinking Fund	3,378 98	*Less* unsold	3,000 00	
Accounts receivable	780 50			$ 87,000 00
Assessments due and uncollected	22,458 11	Land Settlement Board advances		20,940 80
Accrued interest on assessments	1,347 57			$107,940 80
		Balance—		
		Surplus as at December 31st, 1920	$13,530 49	
		Surplus for year ended December 31st, 1921..	2,043 84	
				15,574 33
	$123,515 13			$123,515 13

(*e.*) STATEMENT OF REVENUE AND EXPENDITURE FOR YEAR ENDED DECEMBER 31ST, 1921, WEST NICOMEN DYKE.

Expenditure.		Revenue.	
Maintenance	$12,606 19	Assessments—	
Interest—		May, 1921 $ 7,401 80	
On advances $ 950 04		November, 1921 17,031 83	
On debentures 8,700 00			$24,433 63
	9,650 04	Interest on past due assessments	411 91
Administration charges	360 00		
Sundry expenses	157 93		
Rebates, taxes and interest	27 54		
	$22,801 70		
Balance, being surplus for year carried to balance-sheet	2,043 84		
	$24,845 54		$24,845 54

(*f.*) BALANCE-SHEET AS AT DECEMBER 31ST, 1921, CAMERON DRAINAGE DISTRICT.

Assets.		Liabilities.	
Drainage-works	$8,416 92	Land Settlement Board—	
Assessments due and uncollected	733 17	Mortgage	$8,420 00
		Interest	541 86
		Accrued interest	103 13
		Accounts payable	10 27
			$9,075 26
		Balance, surplus for year ended December 31st, 1921	74 83
	$9,150 09		$9,150 09

(*g.*) STATEMENT OF REVENUE AND EXPENDITURE FOR YEAR ENDED DECEMBER 31ST, 1921, CAMERON DRAINAGE DISTRICT.

Expenditure.		Revenue.	
Interest on mortgage	$627 98	Assessments—	
Accrued interest on mortgage	103 13	April, 1921 $409 64	
Incidental expenses	13 35	October, 1921 409 65	
			$819 29
	$744 46		
Balance, being surplus for year carried to balance-sheet	74 83		
	$819 29		$819 29

(*h.*) BALANCE-SHEET AS AT DECEMBER 31ST, 1921, AGRICULTURAL CREDIT COMMISSION.

Assets.			Liabilities.	
Cash—			Debentures, due May 1st, 1941	$1,000,000 00
On hand	$ 90 00		Accounts payable	40,977 72
In bank	3,487 18		Accrued interest on debentures	7,500 00
		$ 3,577 18	Appraisal fees (unearned)	17 50
Loans		633,645 37	Coupons unpaid	337 50
Mortgages foreclosed		6,927 32		
Overdue interest		18,879 61		
Accrued interest		10,352 13		
Sinking Funds		184,380 62		
Furniture and equipment		400 00		
Discount on debentures		118,165 34		
		$976,327 57		
Balance—				
Deficit as at December 31st, 1920	$64,922 55			
Deficit for year ended December 31st, 1921	7,582 60			
		72,505 15		
		$1,048,832 72		$1,048,832 72

(*i.*) STATEMENT OF REVENUE AND EXPENDITURE FOR YEAR ENDED DECEMBER 31ST, 1921, AGRICULTURAL CREDIT COMMISSION.

Expenditure.		Revenue.	
Land Settlement Board, proportion of operating expenses	$ 5,163 80	Appraisal fees	$ 7 50
Interest on debentures	45,000 00	Legal fees	396 31
Discount, premium, and exchange	4,715 17	Interest	53,219 14
Legal expenses, trustee fees	200 00	Discount on purchase of bonds	287 67
Postage and stationery	252 25		$53,910 62
Depreciation, furniture and equipment	50 00	Balance, being deficit for year carried to balance-sheet	7,582 60
Discount on debentures (1/25 written off)	6,112 00		
	$61,493 22		$61,493 22

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